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E. NELMES.

# THE GENUS CAREX IN INDO-CHINA, INCLUDING THAILAND AND LOWER BURMA

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# THE GENUS CAREX IN INDO-CHINA, INCLUDING THAILAND AND LOWER BURMA

E. NELMES.

## Introduction.

It was originally intended to include the *Carices* of Indo-China in the revision of the Malaysian species (The Genus *Carex* in Malaysia : *Reinwardtia*, I : 221-450 : 1951) but later it was found more convenient, in view of the wish to condense the revision for inclusion in Flora Malesiana, to treat the Indo-Chinese species separately. Indo-China has been made to include Thailand (Siam), which it once loosely did, and Lower Burma has been added because of its geographical contiguity and caricological affinities.

There is no need for a lengthy introduction, as the discussion on phylogeny and classification in the tribe *Cariceae*, and the notes on the chief distinguishing characters in *Carex*, contained in the earlier publication, apply equally well here.

The very wide-leaved species referred to in « The Genus *Carex* in Malaysia » under *C. helferi* Boeck., the only one of this group in Malaysia proper, are in Indo-China represented by as many as a dozen species, including *C. adrienii* E. G. CAMUS, the leaves of which are up to 6.7 cm. wide. There is also a large increase in the number of species in the rather wide-leaved Sect. *Stramentitiae*, which is considered to represent slightly less primitive types of plants, but there is an appreciable diminution in the number of species of Sect. *Filicinae*, the species of which have comparatively narrow leaves. Altogether these members of Subgenus *Indocarex* number 34, which is exactly half of the total for the whole area. These are followed by *Carex petelotii*, the only Indo-Chinese member of Kükenthal's unispi-



Source : MNHN, Paris

cate Subgenus *Primocarex* which, because it is so greatly reduced, is difficult to place relative to the members of the other three subgeneric divisions of *Carex*. Subgenus *Carex* claims 31 of the remaining 33 species, the final 2 representing Subgenus *Vignea*, which is so common in north temperate regions but so rare in the tropics.

If one accepts the view that those *Indocarices* with very wide and more or less elliptic leaves, and inhabiting evergreen forests, represent the most primitive group, then Indo-China is the veritable home of the genus.

Nearly all the widest-leaved species are endemic to one only though not the same one, of the seven divisions into which it is convenient to divide the whole area. Of the total of 34 *Indocarices*, 16 are restricted to one division, as follows : Tongking 6, Thailand 5, Lower Burma 3, Laos 2 ; two species occur in only two divisions, while the remaining 16 members are known from one or more of the divisions, as well as from one or more countries outside our whole area. About half-a-dozen *Indocarices* have a comparatively extended distribution, mostly ranging from India southeastwards to New Guinea or a little beyond and sometimes including China and Japan.

Only 10 of the 31 species of Subgen. *Carex* are restricted to one or another of our seven divisions : to Thailand and Tongking 3 each, and Lower Burma, Laos, Annam and Cambodia 1 each. The remaining Indo-Chinese members of this subgenus, though nearly all occur in one only of the divisions, are also known from one or more outside areas, and of these about 10 are of comparatively rather extensive range, though this is not so consistently of the India to New Guinea type as in *Indocarex*. A few examples will illustrate this : *C. teinogyna* Boott : India, Annam, Sumatra, Japan ; *C. nemostachys* Steud. : India, Thailand, China, Japan ; *C. speciosa* Kunth : throughout Indo-China, and India, Sumatra, Java ; *C. dimorpholepis* Steud. : India, Tongking, China, Korea, Japan ; *C. maubertiana* Boott : India, China, Annam, Sumatra, Java.

## Literature.

There has not been any previous account of the *Carices* of Indo-China, except in H. Lecomte's « Flore Générale de l'Indo-Chine », 1907-50. The treatment of *Carex* in this work is in vol. 7, pp. 180-201, figs. 26-29, 1912-22, where 25 species are recognised as occuring in French Indo-China. R. Gross (in *Notizbl. Bot. Gart.* Berl., 14 : 189-194 : 1938) described 2 new species and 3 new varieties, based on a collection made by A. Petelot in Tongking.

Of the 68 species contained in this revision I am responsible for 24, described mostly in the *Kew Bulletin* during the years 1939-1950, the principal authors of the other 44 species being C. B. Clarke 6, Nees 6, Boott 5, and Franchet 4.

Source : MNHN, Paris

In the references to literature « Clarke » followed by a number indicates a page in C. B. Clarke's « List of the Carices of Malaya » (*Journ. Linn. Soc. Bot.* 37 : I-16 : I904). Similarly, « Kükenth. » stands for Kükenthal's monograph of the Caricoideae (Engler's Das Pflanzenreich, IV, 20 : 824 pp. 1909) and « Nelmes » for my « Carex in Malaysia » (*Reinwardtia*, 1 : 22I-450 : I951).

### Sources of the Material.

The Paris Herbarium supplied the great majority of the specimens on which this work is based, but Kew contributed quite a considerable number, including the extensive collections made by Dr. A. F. G. Kerr in Thailand. The following abbreviations are used for the herbaria from which I have seen and cited specimens : BM. British Museum (Natural History) ; BOG. Bogor ; CAL, Calcutta ; K. Kew ; L. Leiden ; P. Paris.

### Acknowledgements.

I must thank the Director of Kew and the Keeper of the Herbarium for facilities during the production of the revision, which has been prepared mainly in my spare time. For their kind help I am indebted to my colleagues Mr. L. L. Forman and Mr. N. Y. Sandwith, and also to Mr. T. Smitinand, of the Royal Forest Department, Bangkok, Thailand. Finally, my best thanks are due to Mrs. E. M. Gaughan, who has so ably typed my often difficult manuscript, as she also did the much larger MS. of « *Carex* in Malaysia ».

## **CAREX** Linn.

### Key to the Subgenera of Carex.

1. Cladoprophylls absent. Spikes bisexual, sessile. Stigmas 2, very rarely 3 ..... 3. *Vignea.*

I. Cladoprophylls present. Spikes bisexual or unisexual, often peduncled. Stigmas 3 or, much less often, 2 :

2. Spikes bisexual (except in *C. hypolytroides* Ridley), sessile or subsessile. Cladopropbylls utriculiform ..... 1. *Indocarex.*
2. Spikes usually unisexual, often peduncled. Cladoprophylls ocreiform ..... 2. *Carex.*

### Subgen. 1. *Indocarex* Baill.

*Spikes* androgynaeceous (except in *C. hypolytroides*), usually short and numerous, rarely few, sessile or subsessile, usually more or less panicled. *Cladoprophylls* utriculiform, rarely vestigial. *Utricles* more or less trigonous. *Stigmas* 3.

Source : MNHN, Paris

Subgen. 2. *Carex* (*Encarex* Coss. et Germ.).

*Spikes* usually unisexual, sometimes bisexual, often long, several, rarely 1 or numerous, often pedunculed, usually solitary, sometimes fasciculed, simple, rarely compound at the base, often longly spaced from one another. *Cladoprophylls* ocreiform. *Utricles* more or less trigonous or, much less often, plano-convex or bieonvex. *Stigmas* 3 or, much less often, 2.

Subgen. 3. *Vignea* (P. Beauv.) Nees.

*Spikes* bisexual (androgynaeceous or gynaecandrous), very rarely unisexual or dioecious, short, several to numerous, rarely 1, sessile, usually contiguous or approximate. *Cladoprophylls* absent. *Utricles* plano-convex or biconvex. *Stigmas* 2, very rarely 3.

Artificial Key to the Indo-Chinese Species of Carex.

1. Spike 1, terminating the stem ..... 35. *C. petelotii.*
1. Spikes more than 1 on a stem :
2. Terminal and most of the other numerous spikes female, a few smaller ones male (a very tall plant — 100-240 cm. — with a regularly leafy stem) ..... 4. *C. hypolytroides.*
2 bis. Terminal spike gynaecandrous, i. e. male below and female above, or sometimes male at both ends and female in the middle, never female at the base :
3. Spikes sessile, 5-10 mm. long..... 6. *C. craspedotricha.*
3. Spikes pedunculed, 2-7.5 cm. long :
4. Upper 2-3 (4) spikes gynaecandrous ; female glumes oblong, oblong-ovate, or elliptic, 3-3.75 mm. long ; utricles 3.5-4.5 mm. long, dorsally 5-7-nerved ..... 64. *C. kerrii.*
4. Terminal spike gynaecandrous, rarely male at each end ; female glumes spathulate-oblong, 1.5-2.5 mm. long ; utricles 3-3.75 mm. long, nerveless ..... 65. *C. dimorpholepis.*
2 ter. Terminal spike or spikes male (for 2 *quater* see p. 87)
5. Spikes 1-several in 1-3 fascicles..... 37. *C. phacelostachys.*
5. Spikes single at every node :
6. Male spikes 2-5 (7) :
7. Awns of female glumes. 1.5-5 mm. long ; beak of utricle 1.75-2 mm. long ; achenes ellipsoid or rhomboid-ellipsoid..... ..... 62. *C. sacerdotis.*
7. Awns of female glumes 0-2 mm. long ; beak of utricle 0.75-1.3 mm. long ; achenes ovoid, oblanceolate, ellipsoid or oblong-ellipsoid :
8. Leaves 5-7 mm. wide ; female glumes oblong-elliptic, 3.25-4 mm. long ; utricles obovoid or ellipsoid, gradually beaked, mouth extremely dorsally oblique..... 60. *C. chaetogyne.*
8. Leaves 2-5 mm. wide ; female glumes ovate, ovate-lanceolate or oblong-lanceolate, 2.5-3.5 mm. long ; utricles usually ovoid or oblong-ovoid, usually abruptly beaked, mouth not or scarcely oblique ..... 61. *C. fedia.*
6. Male spike 1 (rarely a smaller male spike at its base) :
9. Flowering stems arising from the axils of leaves produced on a short shoot :

Source : MNHN, Paris

10. Leaves 10-18 mm. wide ; spikes 3-6.5 cm. long, lateral ones androgynaeceous ..... 55. *C. thibetica.*
10. Leaves 3-8 mm. wide ; spikes 0.5-1.5 cm. long, lateral ones female :
11. Female glumes 5-5.5 mm. long ; utricles about 9.5 mm. long, glabrous ; achene about 5.25 mm. long, angles deeply sunk into a cavity at the centre.... 56. *C. hoozanensis.*
11. Female glumes 2-4 mm. long ; utricles 4.5-5.8 mm. long, pubescent ; achene 3-3.75 mm. long, angles not sunk into cavities :
12. Stems 5-30 cm. tall ; inflorescence 4.5-9.5 cm. long ; lateral spikes 1.2-2 cm. long ; female glumes mucronate ..... 46. *C. pleurocaula.*
12. Stems 5-7 cm. tall ; inflorescence 1-1.3 cm. long ; lateral spikes 0.5-1 cm. long ; female glumes muticous..... ..... 47. *C. lageniformis.*
9. Flowering stems arising from the centre of the foliage leaves and developed from the shoot upon which these are borne :
13. Stigmas 2 ; utricles and achenes compressed-biconvex..... ..... 66. *C. phacota.*
13. Stigmas 3 ; utricles and achenes more or less trigonous :
14. Utricles 7-10.5 mm. long..... 54. *C. anomocarya.*
14. Utricles 2-6 mm. long :
15. Stems yellowish, bearing leaves only on the upper part, the lower being reduced to sheaths (utricles densely whitish-setulose) ..... 63. *C. maubertiana.*
15. Stems not yellowish, bearing leaves at or near the base of the stem :
16. Utricles pubescent :
17. Stems 30-83 cm. tall ; spikes 3-14 cm. long ; female glumes 1-1.8 mm. long..... 58. *C. nemostachys.*
17. Stems 3.5-38 cm. tall ; spikes 0.4-3 cm. long ; female glumes 2-3 mm. long :
18. Utricles ellipsoid or obovoid-eltipsoid, 2-2.75 mm. long ; achene 1.5-1.6 mm. long.. 51. *C. royleana.*
18. Utricles rhomboid-lageniform, 3.5-6 mm. long ; achene 2.25-4 m. long :
19. Leaves 3-6.25 mm. wide ; terminal spike 10-22.5 mm. long ..... 49. *C. breviscapa.*
19. Leaves 1-3 mm wide ; terminal spike 8-10 mm long ..... 48. *C. rhynchachaenium.*
16. Utricles glabrous :
20. Leaves 2-4 mm. wide ; spikes 1-3 cm. long..... ..... 50. *C. cambodiensis.*
20. Leaves 4-11 mm. wide ; spikes 2-12 cm. long :
21. Bracts sheathing the stem ; leaves 4-8 mm. wide ..... 59. *C. oedorrhampha.*
21. Bracts not or scarcely sheathing the stem ; leaves 6-11 mm. wide ..... 57. *C. baviensis.*

2 quater. Terminal and usually all the other spikes androgynaeceous, i.e. female below and male above :

22. Flowering stems arising from the axils of foliage leaves produced on a short shoot ..... 45. *C. cryptostachys.*
22. Flowering stems developing from lateral shoots, not from those bearing normal foliage leaves :

Source : MNHN, Paris

23. Leaves linear, 2-5 mm. wide, not petioled.. 3. *C. oligostachya.*
23. Leaves elliplic lo oblanceolate, 1.7-6.7 cm. wide, longly or very longly petioled :
24. Leaves 4-6.7 cm. wide, under-surface nerves hispidulous ; female glumes 3.5-4.5 mm. long ; utricles about 5 mm. long.... ..... 1. *C. adrienii.*
24. Leaves 1.7-5.5 cm. wide, under-surface glabrous ; female glumes 2-2.5 mm. long ; utricles 2.75-3.75 mm. long. 2. *C. scaposa.*

22. Flowering stem arising from the centre of a tuft of cataphylls or foliage leaves, and developed from the shoot on which these are borne :
25. Leaves up to 3 cm. or more wide :
26. Foliage leaves all basal, widely linear :
27. Inflorescence continuous, usually from near the base of the stem lo the apex ; stem leaves O ; bracls indistinguishable from lhe 3-5 mm. long, apically rounded female glumes.... ..... 8. *C. pandanophylla.*
27. Inflorescence interrupted, at leasl below, situated on the upper part of the stem ; stem leaves and bracts up to 10 cm. long, with longly acuminate apices :
28. Foliage leaves 2.5-5 cm. wide ; female glumes 5-7 mm. long ..... 5. *C. mapaniifolia.*
28. Foliage leaves 1.2-3.6 cm. wide ; female glumes 2-4 mm. long ..... 6. *C. helferi.*
26. Foliage leaves all cauline, elliplic or linear-elliplic :
29. Leaves glabrous on lhe under-surface excepl at the apex, 0.5-3 cm wide ..... 14. *C. cataphyllodes.*
29. Leaves hispidulous on all nerves on the under-surface :
30. Leaves 3-4.5 cm. wide ; female glumes ovate-lanceolate, apex subacute, muticous or mucronate ; utricles glabrous ..... 9. *C. euprepes.*
30. Leaves missing, bracts 2.3-3 cm. wide ; female glumes oblong-ovate, apex rotund-obluse, aristate ; utricles hispidulous ..... 10. *C. tavoyensis.*

25. Leaves less than 3 cm. wide :
31. Leaves all cauline, stem naked below except for more or less withered, persisleni, elongated cataphylls round the base :
32. Leaves hispidulous on the under-surface nerves..... ..... 11. *C. trichophylla.*
32. Leaves glabrous on the under-surface nerves :
33. Spikes 10-25 mm. long, subdense-flowered ; female glumes 2.5-3 mm. long ..... 12. *C. atrivaginata.*
33. Spikes aboul 5 mm. long, few-flowered ; female glumes 1.5-2 mm. long ..... 13. *C. laosensis.*
31. Leaves basal or sub-basal and sometimes cauline :
34. Lower bracls nol, or lowesl one rarely, sheathing the stem :
35. Leaves 2-4.5 mm. wide ; utricles plano-convex, 2.25-2.75 mm. long, glabrous ; sligmas 2 ..... 67. *C. thomsonii.*
35. Leaves 3.5-25 mm. wide ; utricles trigonous, 4.25-5.75 mm. long, hispidulous ; stigmas 3 :
36. Leaves 10-25 mm. wide ; spikes numerous ; lower bracts much shorler than the inflorescence 7. *C. hypotracheia.*
36. Leaves 3.5-11 mm. wide ; spikes 1-4 ; lower 1-2 bracts much exceeding the inflorescence... 22. *C. tricephala.*

Source : MNHN, Paris

34. Lower and usually upper bracts sheathing, lower usually longly sheathing the stem :
37. Utricles and achenes plano-convex or biconvex ; stigmas 2:
38. Spikes single at each of 1-7 nodes ; utricles 5-7 mm. long, glabrous ..... 44. *C. longipes.*
38. Spikes in fascicles of 1-5 at each of 3-8 nodes ; utricles 2.75-5 mm. long, sparsely whitish-setulose :
39. Beak of utricle 1.25-2 mm. long ; stigmas 7-10 mm. long ..... 42. *C. teinogyna.*
39. Beak of utricle 0.5-1 mm. long ; stigmas up to about as long as the utricles (2.75-4.75 mm. long)..... ..... 43. *C. brunnea.*
37. Utricles and achenes more or less trigonous ; stigmas 3 :
40. Partial inflorescence at each node 1, rarely 2, unbranched peduncled spike :
41. Spikes 2-6 ; female glumes hispidulous, aristate..... ..... 41. *C. kinabaluensis.*
41. Spikes 1-3 (4) ; female glumes glabrous, mulicous :
42. Female part of spike 8-11 mm. thick ; female glumes 4-5 mm. long ; utricles 6-7 mm. long..... ..... 52. *C. pterocaulos.*
42. Female part of spike 2-7 mm. thick ; female glumes 2.25-3 mm. long ; utricles 3.5-6 mm. long :
43. Leaves 3-11 mm. wide ; utricles 4.25-6 mm. long ..... 53. *C. speciosa* var. *speciosa.*
43. Leaves 1.5-2 mm. wide ; ulricles 3.5-4 mm. long ..... 53. *C. speciosa* var. *angustifolia.*
40 bis. One or more secondary panicles borne on 2, less commonly 3, main peduncles at each node :
44. Utricles glabrous :
45. Female glumes 1.75-3 mm. long ; utricles subinflaled, plurinerved, nerves spongy-thickened..... ..... 30. *C. cruciata.*
45. Female glumes 1.5-2 mm. long ; utricles not subinflaled, multinerved, nerves nol spongy-lhickened ..... 32. *C. filicina.*
44. Utricles hispidulous :
46. Spikes 2-6 cm. long ; utricles 7.5-9 mm. long..... ..... 38. *C. vansteenisii.*
46. Spikes 0.4-4 cm. long ; utricles 2-6 mm. long :
47. Leaves 15-25 mm. wide..... 20. *C. setulifolia*
47. Leaves 2-17 mm. wide :
48. Spikes 1-4 cm. long..... 39. *C. toukinensis.*
48. Spikes 0.4-1.8 cm. long :
49. Spikes 4-10 mm. long ; utricles 2-4.25 mm. long :
50. Leaves 7-17 mm. wide ; utricles 2-3.75 mm. long, 1-1.5 mm. broad, beak 0.5-1 mm. long ..... 28. *C. condensata.*
50. Leaves 2-8 (10) mm. wide ; ulricles 3-4.25 mm. long, 0.8-1 mm. broad, beak 1-1.25 mm. long ..... 31 *C. continua.*
49. Spikes 10-18 mm. long ; ulricles 4.75-6 mm. long :

Source : MNHN, Paris

51. Leaves 4-9 mm. wide ; female glumes 3.25-4.5 mm. long ..... 19. *C. perakensis.*
51. Leaves 9-12 mm. wide ; female glumes 5-6 mm. long ..... 36. *C. arrideus.*

40 ter. All secondary panicles borne on only 1 main peduncle at each node :

52. Utricles wholly glabrous or margins hispidulous on the beak :
53. Spikes 2-6 cm. long ..... 33. *C. baccans.*
53. Spikes 0.4-2.2 cm. long :
54. Leaves (2) 2.5-3.2 cm. wide (glumes pallid)..... ..... 23. *C. callista.*
54. Leaves 0.5-2.5 cm. wide :
55. Leaves 2-2.5 cm. wide ; peduncles, rhachis, awns, and utricles rufous-hispidulous ..... ..... 15. *C. balansae.*
55. Leaves 0.5-2 cm. wide ; peduncles, etc. not rufous-hispidulous :
56. Female glumes hispidulous (leaves 1.2-2 cm. wide) ..... 16. *C. spatiosa.*
56. Female glumes glabrous :
57. Spikes 10-22 mm. long, male part of spike much longer than the female part..... ..... 26. *C. indica.*
57. Spikes 4-15 mm. long, male part of spike about as long as to longer than the female part :
58. Female glumes castaneous or with castaneous streaks :
59. Female glumes with castaneous streaks; utricles with spongy-thickened nerves, beak 1-1.5 mm. long ; achenes 1.5-2 mm. long ..... 30. *C. cruciata.*
59. Female glumes castaneous except the whitish margins ; nerves of utricles not spongy-thickened, beak 1.5-2 mm. long ; achenes 2.25-3 mm. long..... ..... 27. *C. dietrichiae.*
58. Female glumes milky white or dirty white :
60. Leaves 6-20 mm. wide ; spikes 5-15 mm. long ; female glumes 2-2.75 mm. long ; utricles 4-5 mm. long..... ..... 24. *C. stramentitia.*
60. Leaves 6-8 mm. wide ; spikes 4-8 mm. long ; female glumes 1.5-2 mm. long ; utricles 3.75-4 mm. long ..... ..... 17. *C. plagiostoma.*

52. Utricles hispidulous on at least a part of their surface besides the margins :
61. Spikes 1-8 cm. long :
62. Leaves 5-10 mm. wide ; spikes 1-8 cm. long ; female glumes with awns up to 1.5 mm. long... ..... 34. *C. myosurus.*

Source : MNHN, Paris

62. Leaves about 4 mm. wide ; spikes 1.5-2 cm. long ; female glumes with awns 1.5-4.5 mm. long..... ..... 40. *C. phyllocaula.*

61. Spikes 4-17 mm. long :
63. Leaves 2-3.2 cm. wide :
64. Leaves (2) 2.5-3.2 cm. wide ; secondary panicles 2-4 ; female glumes 2-2.5 mm. long, pallid.... ..... 23. *C. callista.*
64. Leaves 2-2.5 cm wide ; secondary panicles 5-6 ; female glumes 2.5-4 mm. long, reddish-brown. ..... 15. *C. balansae.*
63. Leaves 4.5-22 mm. wide :
65. Leaves 4.5-12 mm. wide :
66. Leaves 6-12 mm. wide ; female glumes 4-5.5 mm. long ; utricles 6-8 mm. long ..... ..... 18. *C. leucostachys.*
66. Leaves 4.5-6 mm wide ; female glumes 2.5-3 mm. long ; utricles 3.75-4 mm. long ..... ..... 29. *C. spongocrepis.*
65. Leaves 7-22 mm. wide (12-22 mm. wide except in *C. condensata,* 7-17 mm. wide) :
67. Female glumes glabrous :
68. Female glumes 3-3.5 mm. long ; utricles 4.25-4.75 mm long.. 25. *C. sychnostachya.*
68. Female glumes 1.75-3 mm long ; ulricles 2-3.75 mm long ..... 28. *C. condensata.*
67. Female glumes hispidulous :
69. Utricles 5-6 mm. long .. 16. *C. spatiosa.*
69. Utricles 2-4.25 mm. long :
70. Secondary panicles 3 ; utricles 3.75-4.25 mm. long ..... 21. *C. jeanpertii.*
70. Secondary panicles 2-7 ; ulricles 1.75-3 mm. long ..... 28. *C. condensata.*

## Subgen. 1. **INDOCAREX** Baill.

### Key to the Sections.

Spikes unisexual ; leaves sparsely hairy on the under-surface ..... ..... 3. *Hypolytroides.*

Spikes androgynaeceous ; leaves glabrous or hispidulous on the under-surface :

Spikes 1-8 cm long ..... 9. *Polystachyae.*

Spikes 4-25 mm long (4-22 mm long, except in *C. atrivaginata,* 10-25 mm long) :

Stems lateral ; panicles few spiked :

Leaves elliptic-oblanceolate, 4-6.7 cm wide.. 1. *Hemiscaposae.*

Leaves linear, 2-5 mm wide ..... 2. *Scabrellae.*

Stems central ; panicles usually many spiked :

Leaves only on the upper part of the stem .... 5. *Euprepes.*

Leaves at the base and sometimes cauline :

Source : MNHN, Paris

Stems subscapiform ; bracts brown-spadiceous ..... ..... 4. *Mapaniifoliae.*
Stems leafy below ; at least the lower bracts foliaceous :
Secondary panicles usually single ; female glumes and utricles usually whitish to stramineous ; angles of achenes thickened at the centre, apex sometimes discoid-annulate ..... 6. *Stramentitiae.*
Secondary panicles single or binate ; female glumes and utricles pale with reddish spots, streaks or patches, or wholly reddish or castaneous :
Secondary panicles single or binate ; female glumes pale with reddish or castaneous flecks or spots ; style-base more or less thickened..... 7. *Cruciatae.*
Secondary panicles often binate ; female glumes light to dark reddish, fulvous or castaneous ; style-base not or scarcely thickened ..... 8. *Filicinae.*

### Sect. 1. *Hemiscaposae* C. B. Clarke

in *Journ. Linn. Soc.* 37 : 2, 4 (1904), emend. *Nelmes* et *Airy-Shaw* in Hook., Ic. Pl. t. 3434 (1943).

Subsect. *Scaposae* Kükenth. in Engl. Pflanzenreich, IV, 20 : 285 (1909).

*Flowering stems* lateral, bearing subherbaceous infundibuliform-vaginiform bracts and leaves, especially below. *Leaves* of the sterile shoots elliptic to oblanceolate, not sheathing but very longly winged-petiolate, nerves on the under-surface sometimes adpressed-hispidulous. *Panicle* simple or slightly compound, branches distant, pyramidal, loose. *Glumes* more or less castaneous. *Utricles* more or less castaneous, beak not usually marginate nor twisted, smooth, straight. *Achene* not discoid at the apex.

Leaves 4-6.7 cm wide, under-surface nerves hispidulous ; female glumes 3.5-4-5 mm long ; utricles about 5 mm long ..... ..... 1. *C. adrienii.*
Leaves 1.7-5.5 cm wide, under-surface glabrous ; female glumes 2-2.5 mm long ; utricles 2.75-3.75 mm long..... 2. *C. scaposa.*

#### 1. **C. *adrienii*** E. G. Camus.

*Carex adrienii* E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 186 (1912) ; Nelmes in Hook., Ic. Pl. t. 3434 (1943), et in *Kew Bull.*, 1946 : 13, 22 (1946). — Based on *C. scaposa* var. *baviensis* Franch.

*Carex scaposa* C. B. Clarke var. *baviensis* Franch. in *Nouv. Arch. Mus. Hist. Nat.*, Paris, 3 sér., 8 : 255 (1896) ; C. B. Clarke, 8 ; Kükenth., 286. Not *C. baviensis* Franch. — Tongking, *Balansa* 2815.

Tufted. *Rhizome* short, woody. *Stems* lateral, more or less erect, subscapiform, obscurely to obtusely trigonous, 30-60 cm tall, 1-2 mm

Source : MNHN, Paris

thick, smooth below, hispidulous-pubescent above. *Stem leaves* and *bracts* 7-9, evenly spaced except at the base where they are rather crowded, vaginiform, narrowly infundibuliform, subherbaceous, all of similar size, passing abruptly into a short lamina, densely hispidulous-pubescent, mouth of the sheath widely ferrugineous-hyaline, 3-6 cm long. *Leaves of the sterile shoots* 2-3, arcuate, elliptic-oblanceolate, apex longly acuminate, decurrent in an about equally long, recurved-margined, narrowly but deeply canaliculate petiole, the whole 53-98 cm long, blade 4-6.7 cm wide, flat, nerves on the undersurface shortly adpressed-hispidulous ; *sterile shoot* clothed at the base with a few brownish cataphylls. *Inflorescence* a more or less oblong, simple panicle, 14-39 cm long, consisting of 4-6 more or less pyramidal *branches* on long or very long, slender, hispidulous peduncles exserted from the bracts, each branch 4-7-spicate, single. *Spikes* rather numerous, 7-13 mm long, few-flowered, subpatent in flower, becoming patent or slightly reflexed in fruit, male part slightly longer than the female part, which is sometimes absent. *Bracteoles* glumiform, oblong-lanceolate or oblong-ovate, sparsely hispidulous, margins ciliate-hispidulous, with hispidulous-margined awns. *Female glumes* oblong-ovate, oblong-lanceolate, or ovate-lanceolate, more or less cymbiform, apex acute to obtuse, 3.5-4.5 mm long, 1.5-2 mm. wide, thinly membranaceous, margins becoming erose, especially above, hispidulous towards the margins, castaneous with a paler, reddish-spotted, 3-nerved, central stripe, midrib slenderly keeled, usually shortly and scaherulous-excurrent. *Utricles* ellipsoid, about 5 mm long, 1.75-2 mm broad, multinerved, glabrous, becoming patent to subreflexed, dull castaneous-brown, base spongy but scarcely stipitate, subabruptly beaked ; *beak* subterete, 1.5-2 mm long, straight, glabrous, not marginate ; *mouth* oblique, erose-truncate. *Achene* ellipsoid, angles prominent, faces shallowly concave, 2.7-2.8 mm long, 1.75-2 mm broad, stramineous-brown, scarcely stipitate or beaked. *Style*-base slightly thickened.

Tongking : Mt. Bavi, forests, ± 800 m., 28 Oct. 1887, *Balansa* 2815 (K, P) !

Laos : Wiengchan, Pak Munung, evergreen forest, ± 1200 m., 22 April 1932, *Kerr* 21,201 (BM, K) !

Endemic.

*Carex adrienii*, though quite an ordinary species so far as its glumes and fruits are concerned, has several unusual vegetative characters, especially in the shape and petiolate base of the leaves, which are wider than the leaves of any other *Carex*.

### 2. *Carex scaposa* C. B. Clarke.

*Carex scaposa* C. B. Clarke in *Hook. f., Bot. Mag.* t. 6940 (1887) ; C. B. Clarke, 7 ; Kükenth., 285 ; Lecomte, Fl. Gén. Indo-Chine, 7 : 186 (1912). — China, *Ford* ? 14.

Source : MNHN, Paris

Tufted. *Rhizome* short, woody. *Stems* lateral, erect to somewhat curved, subscapiform, more or less trigonous, 10-60 cm tall, 1-3 mm thick, smooth below, hispidulous-pubescent above. Stem *leaves* and *bracts* 3-5, evenly spaced above, including the rhachis, absent below except for several at the base, vaginiform, narrowly infundibuliform, brown to subherbaceous, less frequently subfoliaceous, all of similar size, including an acuminate or attenuate lamina, glabrescent to densely hispidulous-pubescent, mouth not well-defined nor ferrugineous-hyaline, 2-10 cm long. *Leaves of the sterile shoots* few, erect to arcuate, mostly elliptic but sometimes oblanceolate, longly tapering at each end, decurrent into an about equally long or shorter, recurved-margined, narrowly but deeply canaliculate petiole, the whole 15-65 cm long, blade 1.7-5.5 cm wide, flat, glabrous on the under-surface ; *sterile shoot* clothed at the base with a few brownish cataphylls. *Inflorescence* a more or less oblong, simple or slightly compound, panicle, 5-18 cm long, consisting of 3-5 more or less pyramidal *secondary panicles* on long to shorter, slender, glabrous to hispidulous, peduncles exserted from the bracts, each bearing 8-rather numerous spikes, single, lower sometimes binate. *Spikes rather numerous*, 6-12 mm long, few-flowered, becoming patent, male part as long as or shorter than the female part. *Bracteoles* gluniform, oblong-lanceolate, glabrous or glabrescent. *Female glumes* oblong-ovate to oblong-lanceolate, more or less cymbiform, apex acute to obtuse, 2-2.5 mm long, 1-1.5 mm wide, thinly membranaceous, margins pale, erose-ciliolate above, glabrous or sparsely hispidulous in places, wholly reddish-castaneous to pale or light castaneous covered with castaneous flecks and lines, midrib slender, not excurrent. *Utricles* more or less ellipsoid, 2.75-3.75 mm long, about 1 mm broad, nerveless to plurinerved, glabrous, becoming patulous to subpatent, pale to light brownish, sometimes with castaneous spots and flecks above, sometimes becoming wholly brownish, base spongy but scarcely stipitate, subgradually to subabruptly beaked ; *beak* compressed-terete, scarcely to gradually tapering, 1-1.75 mm long, straight or slightly curved, glabrous, narrowly marginate below ; *mouth* oblique, erose-truncate. *Achene* ovate, sometimes elliptic-ovate, angles prominent, pale, 1.8-2 mm long, about 1 mm broad, becoming dark brown, scarcely or very shortly stipitate and beaked. *Style*-base scarcely or slightly thickened.

Tongking : Mt. Bavi, forests, *Balansa* ; Massif of Nan Son, Jan. 1925, *Petelot* 1753 (P) ! ; « Coupe d'amélioration 1929 », ± 1500 m, Aug. 1929, *Petelot* 3579 (P) ! ; Massif of Tam Dao, ± 1000 m., Nov. 1930, *Petelot* sine num. (P.) !

Annam : Prov. of Kontum ; Nui Dai Ding, near Dak Gley, granitic soil, primitive forest, 1200 m., 18 Jan. 1947, *Poilane* 32778 (P) !

China.

I have not seen the Balansa specimen, which is the one cited by E. G. Camus in Lecomte, Flore Général de l'Indo-Chine.

Source : MNHN, Paris

This species with its elliptic leaves and reddish spikes, was first found by the Kew collector Ford, whose plants were grown in Kew greenhouses and figured in the Botanical Magazine.

### Sect. 2. **Scabrellae** Kükenth.
in Engl. Pflanzenr. IV, 20 : 286 (1909).

*Stems* lateral. *Inflorescence* consisting of 6-12 single or binate secondary panicles, each secondary panicle consisting of 1-4 (5) peduncled spikes. *Bracts* short, sheaths ampliate. *Female glumes* usually sparsely hispidulous above, with nerves often reddish. *Utricles* subinflated, glabrous or hispidulous, greenish to reddish-brown. *Achene* obovoid. *Style*-base not thickened.

Only Indo-Chinese species .. 3. *C. oligostachya* Nees ex Hook.

### 3. *Carex oligostachya* Nees ex Hook.

*Carex oligostachya* Nees ex Hook. in *Kew Journ. Bot.* 6 : 29 (1854) ; Nelmes, 244. — Philippine Islands, *Cuming* 1795.

*Carex rhizomatosa* Steud., Syn. Pl. Glum. II, Cyper., 206 (1855) ; C. B. Clarke, 12 ; Kükenth., 289 ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 193 (1922). — Lesser Sunda Islands, Sumbawa, *Zollinger* 3447.

Tufted. *Rhizome* shortly creeping, sheathing-scaly. *Stems* erect or suberect, subsetapiform, bearing a few, short-bladed leaves, evenly spaced or only subbasal, 20-88 cm tall, 0.75-2 mm thick, smooth, including the rhachis, except the sometimes sparsely hispidulous apical angles, base clothed with a mass of brown or purplish-brown to fuscous fibrous remains of withered leaf-sheaths. *Leaves of the sterile shoots* few, much shorter than the flowering stems, 2-5 mm wide, flat or flattish, margins sometimes slightly revolute, upper surface sometimes scaberulous above, apex shortly attenuated. *Inflorescence* a simple, interrupted panicle 9-47 cm long ; *secondary panicles* erect, lower single, upper unequally binate, rarely ternate, oblong, ovoid, or subglobose, upper contiguous to subapproximate, lower distant to remote, upper on scarcely to shortly, lower on longly to very longly, exserted peduncles ; *peduncles* obscurely angled or compressed, very slender, smooth, scarberulous on the angles up through the rhachis. *Bracts* foliaceous, lower usually shorter than their peduncled panicles, longly sheathing, upper reduced, usually exceeding their panicles, sometimes slightly exceeding the stem, all shortly sheathing ; *sheaths* membranous and often reddish near the mouth. *Spikes* ovoid, ellipsoid, or shortly cylindric, 4-10 mm long, subdense-flowered, lateral becoming patulous to subpatent, sessile, male and female parts about equal in length, or male shorter. *Bracteoles* indistinguishable from the glumes. *Female glumes* ovate to ovate - oblong - lanceolate, flattish - cymbiform, apex obtuse to very obtuse, rarely subacute, 2-3 mm long, 1.25-2 mm wide, pale brownish,

Source : MNHN, Paris

often with reddish spots, streaks, and patches, narrowly to very widely whitish-hyaline margined, nervose, midrib coalescing above with 2 adjacent nerves and usually excurrent in a minutely hispidulous awn up to 1 mm long. *Utricles* ellipsoid, obtusely to obscurely trigonous, 2.5-4 mm long, 1-2 mm broad, multinerved, narrowly marginate, glabrous, or sparsely hispidulous above, becoming subpatent to patent, base spongy but scarcely stipitate, subgradually to subabruptly beaked ; *beak* subconic or compressed-conic, 0.75-1 mm long, marginate below, glabrous or sparsely hispidulous-margined, straight, bidentulate ; *mouth* slightly oblique ; teeth about 0.25 mm long, straight, often becoming erose. *Achene* angles prominent, faces subconcave, 2-2.25 mm long, about 1 mm broad, cinereous or yellow-brown, sometimes blackish above, very shortly stipitate and beaked.

Tongking : Hanoi, Lat-son, *Bon* 3106 ; « Tonkin », *Balansa* 220 ; near the village of Tchan-tiao, Pho-cam, at the foot of Mt. Bavi, grassy hills, 24 July 1886, *Balansa* 2824 (K) !

India, Upper Burma, Malaysia, Solomon Islands.

Sect. 3. **Hypolytroides** Nelmes
in *Kew Bull.* 1951 : 121 (1951).

*Stems* often extremely tall, nodose. *Leaves* regularly situated throughout the stem, not crowded at the base, under-surface sparsely hairy. *Spikes* unisexual, those of the lower panicles mostly female (usually 2 male), those of the uppermost panicle sometimes all male. *Utricles* small, becoming patent, reddish, abruptly small-beaked.

Only Indo-Chinese species ..... 4. *C. hypolytroides.*

4. ***Carex hypolytroides*** Ridley.

*Carex hypolytroides* Ridley in *Journ. F.M.S. Mus.* 8, Pt. IV, Bot., 124 (1917) ; Nelmes, 246. — Sumatra, *Robinson & Kloss* 55.

*Carex hypolytroides* Gross et Mattf. (pro. sp. nov.) in *Notizbl. Bot. Gart. Berl.*, 14 : 190 (1938). — Tongking, *Petelot* 3174.

Tufted. *Rhizome* woody. *Stems* subacutely trigonous, 100-240 cm tall, 3-5 mm thick, smooth and glabrous below the rhachis, pale yellowish, surrounded at the base by very few, small, reddish-brown cataphylls or leafless-sheaths. *Leaves* shorter than the stem, 4-8.5 mm wide, flattish, margins revolute ; *sheaths* glabrous and often dark reddish-brown below, especially near the nodes, hairy above, membranous and often ferrugineous in front, mouth concave ; *ligular zone* rather long, ferrugineous, produced into a hairy ligule. *Inflorescence* a compound, rather slender, interrupted panicle, occupying the upper 25-40 cm of the stem ; *secondary panicles* 6-8, erect or suberect, single or lowest sometimes binate, corymbose, upper approximate lower distant from one another, 2-3 cm long, 3-5 cm broad, rather lax, all on rather slender exserted peduncles, lower or nearly all branches

Source : MNHN, Paris

branched again into 2-7 simple spikes, upper branches simple spikes, patulous to patent ; *peduncles* wiry, more or less trigonous, hairy. *Rhachis* covered with long, whitish subadpressed hairs. *Bracts* foliaceous but upper reduced though slightly exceeding the stem, lower falling short of it, upper shortly lower longly or very longly sheathing; *sheaths* similar to the leaf-sheaths. *Spikes* unisexual, female numerous, 10-20 on each secondary panicle, shortly cylindric, on short, straight to curved, very slender pedicels, dense-flowered, 5-8 mm long, 3.5-4.5 mm thick, male spikes few, 2 (rarely 1), situated opposite each other, just below the base of the terminal female of each branch of each secondary panicle, sessile, patent, rather few-flowered, ellipsoid, about 4 mm long, 1.5-1.75 mm thick. *Bracteoles* glumiform, longly to shortly aristate. *Cladoprophylls* multinerved, hairy, upper margin narrowly whitish-erose, 2-6 mm long. *Female glumes* ovate-lanceolate, deeply cymbiform, apex acute or subacute, 2-2.75 mm long, 1-1.5 mm wide, pale-subadpressed-hispidulous, slenderly nervose, reddish, base often paler, margin irregularly whitish-hyaline, erose, midrib shortly excurrent. *Utricles* obovoid, angles obtuse, prominent, faces flattish above, shallowly concave below, 1.5-2 mm long, 1-1.1 mm broad, glabrous, straight, dorsally dull blackish-red and papillose above, dull reddish below, ventrally pale but densely glandular-spotted, dorsally sometimes nerveless but usually 3-5 nerved above, ventrally nerveless or slenderly about 2-nerved above, tapering below to a spongy-thickened base, apex abruptly beaked ; *beak* conic, bidentulate or very shortly bilobed ; *mouth* very small, not or scarcely oblique ; *teeth* with membranous apices which become erose and subentire. *Achene* obovoid to subglobose but tapering below, angles prominent, faces concave below, 1.2-1.5 mm long, 0.75-1 mm broad, brown overlaid whitish-papillose, base often slightly bent, not stipitate, apex rounded, erostrate. *Style* very short, base thickened.

Tongking : Chapa ; track on the ridge of Lo Tui Ho, about 1800 m., in forest, Sept. 1927, *Petelot* 3174 (B) !

Annam : Prov. of Kontum, Massif of Ngok Pan, primitive forest, granitic soil, 2200 m., 16 Dec. 1946, *Poilane* 35,856 (P) ! This Annam plant is very immature but seems more likely to be *C. hypolytroides* than the Chinese *C. moupinensis* Franch., the only other member of the section.

Sumatra.

A note on this remarkable sedge in my revision of the Malaysian *Carices* remarked on its *Scleria*-like stem. In its corymbiform panicles it strikingly recalls another Cyperaceous genus - *Hypolytrum*. This resemblance not only influenced Ridley in choosing its epitbet, but also Gross and Mattfeld who, more than twenty years later, described Petelot's gathering as a new species under the same epithet, apparently in ignorance of Ridley's publication.

Source : MNHN, Paris

Sect. 4. **Mapaniifoliae** Nelmes et Airy-Shaw
in Hook., Ic. Pl. 35 : tab. 3434 (1943).

*Stems* central, subscapiform, usually bearing spadiceous bracts in place of foliage leaves, which loosely surround the base of the stem, the whole surrounded by withered cataphylls. *Leaves* conduplicate-petiolate below, blade wide to very wide (up to 5 cm). *Secondary panicles* contracted and dense. *Female glumes* acute to very obtuse or truncate-bilobed at the apex, whitish to brown. *Utricles* with a more or less globose apex ; beak very long.

Inflorescence continuous, usually from near the base of the stem to the apex ; stem leaves 0 ; bracts indistinguishable from the 3.5 mm long, apically rounded glumes.... 8. *C. pandanophylla.*

Inflorescence interrupted, at least below, situated on the upper part of the stem ; stem leaves and bracts up to 10 cm long with longly acuminate apices :

Foliage leaves hristly on the under-surface, 1-2.5 cm wide ; secondary panicles sessile ; female glumes 2.25-3 mm long, apex acute to very obtuse ..... 7. *C. hypotracheia.*

Foliage leaves glabrous on the under-surface, 1.2-5 .cm wide ; secondary panicles, or at least the lowest, on long or very long peduncles ; apex of female glumes ohtuse to bilobed-emarginate :

Foliage leaves 2.5-5 cm wide ; female glumes 5-7 mm long. ..... 5. *C. mapaniifolia.*

Foliage leaves 1.2-3.6 cm wide ; female glumes 2-4 mm long. ..... 6. *C. helferi.*

It may be noted that the leaves in this Section, though sometimes very wide, are never elliptic or oblanceolate as are those of some members of the other wide-leaved sections, Sect. *Hemiscaposae* and *Euprepes*.

### 5. *Carex mapaniifolia* Ridley.

*Carex mapaniifolia* Ridley in *Journ. F.M.S. Mus.* 10: 124-5 (1920) ; Nelmes in *Kew Bull.* 1946 : 6, 22 (1946). — Thailand, Tasan, *Kloss* 7012.

Tufted. *Stems* erect, central, trigonous, 30-40 cm tall, 2-2.5 mm thick below, smooth, base clothed with mostly long, palish to dark brown, tubular sheaths and short acuminate blades, 4-10 cm long, mostly covering the stem, merging above into bracts, smooth below, often adpressed-hispidulous above, especially on the margins and towards the apices, light brown to blackish nervose. *Foliage leaves* 4-6, loosely surrounding and scarcely sheathing the base of the stem, 40-120 cm long, 2.5-5 cm wide, conduplicate-petiolate below, gradually

Source : MNHN, Paris

widening upwards into a linear blade, acuminate, apex acute or subacute, more or less arcuate, septate-nodulose, surrounded at the base by brown withered cataphylls, 4-20 cm long. *Inflorescence* immature, a compound panicle, dense, continuous above, interrupted below, 6-17 cm long, 8-20 mm thick ; *secondary panicles* 5-10, upper contiguous, lower contiguous to distant, contracted and very dense, upper sessile or subsessile, lower on shortly to rather longly exserted peduncles, lower branches extremely short, probably again branched into several simple sessile spikes, upper branches simple spikes ; *peduncles* subterete to trigonous, angles smooth or scaberulous, faces often setulose above, otherwise smooth. *Bracts* as stem leaves but upper shorter, especially the sheaths. *Spikes* androgynaeceous, narrowly ellipsoid to subconic, suberect, densely aggregated. *Bracteoles* glumiform, longly awned. *Female glumes* ovate-elliptic or oblong-lanceolate, cymbiform, apex obtuse or very obtuse and often bilobed-emarginate, lobes becoming erose-acute, 5-7 mm long, 2-3 mm wide, usually subadpressed-pubescent towards the apex, whitish but with numerous strong castaneous nerves in the centre, upper margins becoming erose, midrib and 2 adjacent nerves coalescing upwards and excurrent in a hispidulous awn about 1 mm long. *Utricles* very immature, 4-5 mm long, with long teeth or lobes at the apex and a hispidulous margin.

THAILAND : Pen. Thailand ; Tasan, *Kloss* 6881, 7012 (K) ! ; Langsuan, Ban Krayae, c. 200 m, in evergreen forest, 19 Feb. 1927, *Kerr* 12,012 (K) ! ; Surat ; Sawng Pi Nawng, c. 100 m, in bamboo forest, 21 March 1927, *Kerr* 12,400 (K) !

Endemic.

### 6. *Carex helferi* Boeck.

*Carex helferi* Boeck. in *Linnaea*, 40 : 365 (1876) ; Kükenth., 286 ; Nelmes, 248. — Lower Burma, *Helfer* 6111/2.

Tufted. *Rhizome* short. *Stems* erect to subcurved, central, 20-40 cm tall, 1-2 mm thick below, angles smooth to scaberulous, faces glabrous to minutely setose, base clothed with several brown to fuscous, short-bladed, sheathing bract-like leaves, 5-10 cm long, these surrounded by 2-6 foliage leaves, around the base of which are spadiceous to pale, withered, brownish to blackish-nerved, cataphylls or their fibrous remains, very short to 16 cm long. *Foliage leaves* much longer than the stems, 1.2-3.6 cm wide, conduplicate-petiolate below, gradually widening upwards into a flat, linear blade, oblique to arcuate, longly acuminate, apex acute to obtuse, upper surface sometimes sparsely covered above with pale, adpressed, minute bristles, septate-nodulose, scarcely to shortly sheathing. *Inflorescence* a compound, interrupted panicle, 8-22 cm long ; *secondary panicles* 3-6, single, more or less oblong-ovoid, erect to patulous, 2-3.5 cm long, 1.25-2.5 cm



Source : MNHN, Paris

broad, upper subapproximate to rather distant, lower distant or very distant, from one another, contracted and very dense, upper on shortly to rather longly, lower on longly to very longly, exserted peduncles, lower branches extremely short, probably again branched into several sessile, simple spikes, upper branches simple spikes ; *peduncles* subterete to trigonous, angles smooth or scaberulous, faces often setulose above, otherwise smooth. *Rhachis* of the secondary panicles hispidulous on the angles, which are acute. *Bracts* not foliaceous but light brown or spadiceous, usually as long as the peduncles, none exceeding their panicles, blades short, subadpressed-setulose or paleaceous on the back except at the base, acuminate, apex acute, conduplicate to flattish, uppermost shortly remainder longly sheathing ; *sheaths* ampliate, mouth deeply concave, often lighter in colour at the node. *Spikes* androgynaeceous (some terminal ones possibly male) more or less oblong, becoming ovoid, 6-10 mm long, palulous to patent, densely crowded, male part usually much longer and later more slender than the few-flowered female part, which becomes 5-8 mm or more thick. *Bracteoles* almost indistinguishable from the glumes. *Female glumes* oblong or ovate-oblong, shallowly cymbiform, apex obtuse to truncate-bilobed, 2-4 mm long, 1.5-2 mm wide, margins widely whitish-hyaline, becoming erose, otherwise nervose, glabrous or scurfy-hispidulous, pale brown to whitish, midrib and 2 adjacent nerves converging upwards and excurrent in a wide, hispidulous-margined, sometimes curved or flexuous awn, 1-3.75 mm long. *Utricles* ellipsoid, angles very prominent, obtuse, faces shallowly concave, 6-7 mm long, 1.5-1.8 mm broad, strongly multinerved, marginate, glabrous below, hispidulous or paleaceous above, patulous, stramineous, becoming brown, contracted below into a short, stout stipe, abruptly contracted above into a subglobose apex, 0.5 mm or more in diameter, then subabruptly beaked ; *beak* oblong, compressed, 3-3.5 mm long, scarcely to narrowly marginate, hispidulous, curved, sometimes twisted, whitish, becoming brownish ; *mouth* extremely dorsally oblique. *Achene* ellipsoid to obovoid-ellipsoid, angles prominent, faces shallowly concave, about 2.75 mm long, 1.5-1.75 mm broad, becoming dark brown, angles paler, abruptly scarcely to very shortly and stoutly stipitate, tapering above, apex rounded, abruptly scarcely to very shortly beaked. *Style*-base pyramidally thickened, forming a disc, about 0.5 mm in diameter.

Lower Burma : Tenasserim ; 7 March 1838, *Helfer* (Kew distrib.) 6111/2 (K) ! ; Mergui, Maran, Maliwun, 60 m, 16 April 1928, *Sukoe* 7743 (K) !

Thailand : Pen. Thailand ; Pang-nga, Kao Bangto, 24 Feb. 1929, *Kerr* 17,227 (BM, K) !

Sumatra, Borneo.

Source : MNHN, Paris

### 7. *Carex hypotracheia* Nelmes.

*Carex hypotracheia* Nelmes in *Kew Bull.* 1949 : 39 (1949). — Thailand. *Wichian* 591.

Densely tufted. *Stems* suberect, slightly flexuous, central, 35-55 cm tall, 2 mm thick below, smooth below the rhachis, stramineous-brown, a few, small, setaceous, membranous, sheathing leaves near the base, surrounded by 3-6 basally membranous-margined but non-sheathing foliage leaves, the whole surrounded at the base by withered elongated cataphylls, entire, becoming fibrous. *Foliage leaves* much longer than the stems, 1-2.5 cm wide, erect or suberect, linear-elliptic, flat to subplicate, smooth below, upper surface setulose above, under-surface above or wholly covered with bristles, septate-nodulose in places on the upper surface, longly acuminate above, narrowed below into a long, tightly conduplicate, pallid, petiolar basal part. *Inflorescence* a slender panicle, 9.5-17.5 cm long ; *secondary panicles* 8-12, subglobose, ovoid or ovoid-cylindric to oblong-cylindric, 1-4.5 cm long, 8-15 mm thick, lower approximate or contiguous, upper contiguous to crowded, sessile, cream coloured in life, light-brown when dried, each composed of 2-9 globose, dense, sessile, capitate branches, each of which bears several densely crowded simple spikes. *Bract* of the lowest panicle subherbaceous, shorter or much shorter than the main inflorescence, remaining bracts glumiform, aristate, upper ones much reduced, all inconspicuous, none sheathing. *Spikes* androgynaeceous (some terminal ones male), about 5 mm long, spreading, sessile, female part few-flowered, rather shorter than the male part. *Bracteoles* glumiform but much smaller than the glumes, often hispidulous with long hispidulous-margined awns. *Female glumes* narrowly oblong, ovate, ovate-lanceolate, or oblong-lanceolate, few lower sometimes smaller and sterile, cymbiform, apex acute to very obtuse, 2.25-3 mm long, 0.75-1.5 mm wide, strongly nervose, sometimes minutely scurfy-hispidulous, pallid to stramineous, becoming light brown, apex sometimes erose-ciliolate, midrib coalescing with 2 adjacent nerves at the apex and excurrent in a smooth to hispidulous-margined awn 0.25-1 mm long. *Utricles* ellipsoid or rhomboid, angles prominent, faces shallowly concave, 4.25-4.75 mm long, 1.2-1.4 mm broad, nearly nerveless or slenderly few-nerved, glabrous below, hispidulous above at the apex, narrowly marginate, subpatulous, straight, not or shortly stipitate, subgradually to subabruptly contracted above into a beak ; *beak* slightly tapering, compressed above, base slightly inflated, 2-2.25 mm long, scarcely to narrowly marginate, hispidulous-margined, pale, bidentate ; *mouth* dorsally oblique. *Achene* rhomboid-ellipsoid but tapering below, angles prominent, medianly thickened, faces shallowly concave, about 2.25 mm long, 1.2-1.3 mm broad, dark reddish-brown, scarcely to very shortly pale-stipitate ; *beak* or *apical neck* stout, conic-cylindric, 0.2-0.25 mm long. *Style*-base scarcely to slightly thickened.

Source : MNHN, Paris

Thailand : S.W. Thailand ; Kanburi, Wangka, by stream in bamboo forest, c. 200 m, 10 Feb. 1926, *Kerr* 10,488 (K) ! ; near Neeckey and Wangka, deep in valley, in damp sandy loam, 150 m, 16 May 1946, *Wichian* (Kwaé Noi River Basin Exp. 1946, No. 591) (K, L) !

Endemic.

For a number of years I knew this only through Kerr's immature gathering which could be recognised as new but not in a fit state to publish. Patience was at last rewarded in the 1946 fruiting specimen of Wichian. It is a remarkable reduced *Indocarex* with densely contracted panicles.

### 8. *Carex pandanophylla* C. B. Clarke.

*Carex pandanophylla* C. B. Clarke in Hook. f., Fl. Brit. Ind. 6 : 715 (1894). — Lower Burma, *Kurz* 2704.

Loosely tufted. *Rhizome* very short. *Stems* central, scarcely to very little developed below the inflorescence and hidden among the leaf-bases, surrounded, below and outside the leaves, by a few wide, membranous, apically attenuated, brownish cataphylls. *Leaves* basal, slightly to very much longer than the inflorescence, 2.5-4 cm wide, flat or flattish, often curved, tapering below into a short, pseudopetiolate base, which is often conduplicate and curved, septate-nodulose, apex acuminate to attenuated, with margins at the brown membranous base but not sheathing. *Inflorescence* (immature) a narrow, contracted, compound panicle, oblong, straight to curved, occupying almost or quite the whole stem, 12-24 cm long ; *secondary panicles* 6-10, lower elongated, 2-6 cm long, bearing about 2-6 subglobose heads of sessile spikes, upper forming subglose heads of sessile spikes, 1-1.5 cm in diameter. *Rhachis* of the primary and secondary panicles scabro-hispidulous ; *main rhachis* trigonous, 2-3 mm thick below, rigid, straight to curved. *Bracts* glumiform, short, wide, midrib not excurrent. *Spikes* (immature), ? androgynaeceous, 6-8 mm long, lanceolate-cylindric, dense-flowered, stellately spreading, male and female parts too immature to be distingnished. *Bracteoles* glumiform, small, midrib excurrent in a long to very long, sometimes curved or flexuous, hispidulous-margined awn. *Female glumes* (immature), oblong, deeply cymbiform, apex usually rounded, sometimes subtruncate or slightly bilobed-emarginate, 3-5 mm long, 1.4-1.8 mm wide, subadpressed and pale scurfy-hispidulous, brownish, darker brown near the widely whitish-hyaline erose apex, strongly nervose, midrib, from below the apex on the back, excurrent in a straight or curved hispidulous margined awn, 1-2.5 mm long. *Utricles* undeveloped.

Lower Burma : Pegu Yomah ; east and west slopes, Choungmenah Choung, [received at Kew in 1872], *Kurz* 2704 (K) !

Endemic.

Because the only specimens known to him were immature, and appeared to be such a queer plant, C.B. Clarke published this species

Source : MNHN, Paris

with a question mark against it. I, too, have never seen it in fruit, but there is a picture of what purports to be this species, fruiting, in Lecomte, Not. Syst. 1 : 293, fig. 20 (1910). This figure is, to me, very doubtfully *Carex pandanophylla* though it does represent a species of *Indocarex* allied to *C. indica* L.

### Sect. 5. **Euprepes** Nelmes et Airy-Shaw in Hook., Ic. Pl. t. 3433 (1943).

*Flowering stems* central, bearing leaves only on the upper part, below the inflorescence, naked below except for withered persistent elongated cataphylls round the base. *Leaves* elliptic or linear-elliptic, longly sheathing the stem, usually shortly subpetioled, nerved on the under-surface, sometimes adpressed-hispidulous. *Panicle* compound or simple ; *secondary panicles* more or less oblong. *Cladoprophylls* sometimes bilobed, vestigial in *C. euprepes*. *Glumes* whitish to brownish. *Utricle* whitish to reddish-brown, beak flattish, often twisted, margins hispidulous. *Achene* discoid at the apex, or *style*-base discoid annulate.

Leaves hispidulous on the under-surface nerves :

Leaves 1.2-2 cm wide ; utricles 6-6.5 mm long, beak 3-4 mm. long ..... 11. *C. tricophylla*.

Leaves 2.3-4.5 cm wide ; utricles 4-5 mm long ; beak 1.5-2 mm long:

Leaves 3-4.5 cm wide ; utricles glabrous except the hispidulous margins ..... 9. *C. euprepes*.

Leaves 2.3-3 cm wide ; utricles densely hispidulous except the glabrous base ..... 10. *C. tavoyensis*.

Leaves glabrous on the under-surface nerves :

Spikes about 5 mm long, few-flowered ; glumes 1.5-2 mm long... ..... 13. *C. laosensis*.

Spikes 8-25 mm long, subdense-flowered ; glumes 2.5-3 mm long :

Bracts sheathing ; spikes 10-25 mm long ; female glumes ovate, apex acute or subacute ..... 12. *C. atrivaginata*.

Bracts not sheathing ; spikes 8-15 mm long ; female glumes oblong, apex rounded ..... 14. *C. cataphyllodes*.

This is a most remarkable group with central stems and more or less elliptic foliage leaves borne only on the upper part of the stem, the base of which is clothed with quickly withering cataphylls. Every one of the six species has a very restricted endemic distribution in one or another of the countries of Indo-China including Lower Burma. Note the striking similarities and contrasts between a representative species of this Section, *C. euprepes* Nelmes, and *C. adrienii* E. G. Camus, which belongs to that other striking section, Sect. *Hemiscaposae*. Each has non-linear leaves, the under-surface nerves of which are beset with bristles, but while one has central flowering stems bearing leaves only above, the other bears its leaves on short shoots, which are lateral to the flowering stems.

Source : MNHN, Paris

### 9. *Carex euprepes* Nelmes.

*Carex euprepes* Nelmes in *Kew Bull.* 1939 : 305 (1939) et 1946 : 13, 23 (1946) et in Hook. Ic. Pl. t. 3433 (1943). — Laos, *Kerr* 20, 927.

*Rhizome* short. *Stem* erect, prominently but obtusely trigonous, sides concave, about 70 cm tall, about 3 mm thick below, rigid, smooth, ribbed and striate, naked in the lower third except at the base, which is clothed with membranous, sparsely pubescent, withered leafless or short-bladed sheaths up to 10 cm long. *Leaves* 4-6, situated in the upper two-thirds of the stem, sometimes crowded, patulous, elliptic, base shortly subpetiolate, apex acuminate and acute, 17-24 cm long, upper 1-4 exceeding the stem, 3-4.5 cm wide, flat, upper 1-2 strictly bracts, adpressed-hispidulous on all under-surface nerves, sheathing ; *sheaths* costate, glabrescent below, hispidulous above, a membranous brown appendage at the mouth. *Inflorescence* an erect, rather slender, compound paniele, 10-15 cm long ; *secondary panicles* few, subereet, more or less oblong, braeteate, lower subfastigiate on scareely exserted peduncles. *Rhachis* angles glabrous to sparsely hispidulous. *Spikes* 8-10 mm long, few-flowered, divarieate, male and female parts about equal in length. *Bracts* mostly much smaller than the leaves, lower foliaeeous, subfoliaeeous or subherbaeeous, upper glumiform, longly aristate, mostly shorter than their seeondary panieles, sheathing. *Bracteoles* glumiform, oblong or ovate-oblong, obtuse, apex sometimes notched, sparsely hispidulous, margins whitish-hyaline, with an hispidulous-margined awn. *Cladoprophylls* vestigial, ligulate, eiliate, about 1 mm long. *Female glumes* ovate or ovate-laneeolate, eymbiform, apex subacute, 2-2.5 mm long, 1-1.5 *m*m wide, glabrous, nervose, whitish-stra*m*ineous or brownish-white, erose midrib often shortly exeurrent. *Utricles* ellipsoid, 4-4.5 *m*m long, 1.25-1.75 *m*m broad, *m*ultinervose, narrowly marginate above, glabrous, margins hispidulous, divarieate, pale greenish-brown or brightly stramineous, very shortly stipitate, apex subabruptly beaked ; *beak* flattish, 1.5-2 mm long, marginate, hispidulous-margined, bent at the base, often slightly twisted, bidentate ; *mouth* oblique ; *teeth* lobe-like, straight. *Achene* rhomboid-ellipsoid, faces shallowly concave, especially below, 2.25-2.5 mm long, 1.25-1.5 *m*m broad, golden or rieh brown, very shortly stipitate, abruptly constricted just below a discoid-annulate apex. *Style*-base thiekened.

Laos : Tawieng, Chiengkwang, in evergreen forest, c. 900 m., 6 April 1932, *Kerr* 20, 927 (BM, K, P) !

### 10. *Carex tavoyensis* Nelmes.

*Carex tavoyensis* Nelmes in *Kew Bull.* 1948 : 67 (1948). — Burma, *Russell* (Bot. Surv. Ind. Field No. 1935).

*Rhizome*, stem (exeept the *rhachis*), and *leaves* unknown. *Rhachis* flexuous, hard, rigid, angles prominent, obtuse to subaeute, sometimes slightly twisted, 2-2.5 mm thiek below, lower part of internodes

Source : MNHN, Paris

smooth, upper part subadpressed-hispidulous. *Bracts* foliaceous, probably nearly as large as the missing leaves, linear-elliptic, all except the much smaller uppermost similar in size, 25-28 cm long, 2.3-3 cm wide, all far exceeding the stem, flat, under-surface sparsely covered with minute bristles, subadpressed from both sides of every nerve, tapering below to a scarcely petiolar base, and above to an acute or subacute apex, sheathing ; *sheaths* loose but subrigid with a brown membranous erose-margined apical collar, usually minutely scurfy-hispidulous in front above, otherwise glabrous. *Inflorescence* a compound, interrupted, narrowly oblong panicle, 15-25 cm long ; *secondary panicles* 3-5, 2.5-9 cm apart, mostly erect, singte, more or less oblong-pyramidal, rather dense, 2-4.5 cm long, 1.5-2.5 cm broad, lower on rather shortly upper on shortly or very shortly exserted peduncles, lower branches again branched into 2-7 simple spikes, upper branches simple spikes ; *peduncles* firm, glabrous or scaberulous. *Rhachis* of the secondary panicles with acute hispidulous angles, and often hispidulous on the sides. *Spikes* 5-9 mm long, patulous to patent, female part few-flowered, male part dense-flowered. *Bracteoles* glumiform, small, aristate ; *awn* flexuous or curved, 3 cm or more long, hispidulous-margined, apex bilobed. *Female glumes* oblong-ovate, flattish to cymbiform, apex obtuse to rounded and ciliolate, 2-2.5 mm long, about 1 mm wide, glabrous, very slenderly nervose, light castaneous, margins palish, midrib and 2 adjacent nerves coalescing above to form a stoutish, hispidulous-margined awn, from below the apex, 0.5-2 mm long, straight to somewhat curved. *Utricles* (not fully developed) ellipsoid of obovoid-ellipsoid, tapering to each end, but especially below, angles obtuse, 4-5 mm long, about 1 mm broad, multinerved, base glabrous, otherwise pale subadpressed-hispidulous, becoming patulous, dark reddish-brown below, paler above, not or scarcely stipitate, subabruptly beaked; *beak* scarcely tapering, 1.5-2 mm long, multinerved, marginate, hispidulous-margined, sides glabrous, straight or straightish, pale, bidentulate ; *mouth* somewhat oblique ; *teeth* lobe-like, hyaline-tipped. *Achene* (not fully developed) ellipsoid, about 2.3 mm long, less than 1 mm broad, light brown, not stipitate, apex truncate and slightly thickened, forming a shortly cylindric beak. *Style*-base slightly thickened.

Lower Burma : Tavoy ; Heinzi Choung, No. 1 Camp, 520 m, 3 April 1921, *P. T. Russel* (Bot. Surv. Ind. Field No. 1935) (K) !

The following imperfect, immature specimens either belong here or are allied undescribed species.

Lower Burma : Tavoy; Valley of the Kyong Pyn Chaung, 150 m, 29 Jan. 1919, *Gage* 16 (K)! ; Headwaters of the Sedi Chang, 13 Sept. 1920, *Russell* 1844 (K) !

The first mentioned has narrower bracts, and the second wider bracts and longer spikes than those of the type.

Source : MNHN, Paris

### 11. *Carex trichophylla* Nelmes.

Carex trichophylla *Nelmes, sp. nov.; affinis* C. tavoyensi *Nelmes, sed foliis angustioribus, utriculis majoribus rostris longioribus praecipue differt.*-Tongking, *Petelot* 5325.

Loosely tufted. *Rhizome* short. *Stem* erect, angles obtuse, sides concave, 45-65 cm tall, rigid, glabrous below, increasingly hispidulous upwards above ; naked in the lower 8-15 cm except the base, which is clothed with sparsely pubescent, withered, short-bladed cataphylls up to 10 cm long. *Leaves* up to 6 or more, more or less evenly spaced throughout much of the stem, suberect to patulous, scarcely petiolate at the base, elliptic but apex attenuated, 12-18 cm long, none, or upper much, exceeding the stem, 12-20 mm wide, flat, upper 1-2 sometimes subtending depauperate secondary panicles, sparsely adpressed hispidulous-villous on the under-surface nerves, margins often hispidulous-ciliate, sheathing ; *sheaths* costate, lower glabrous, upper sparsely hispidulous-villous, a membranous, brown appendage at the moulh. *Inflorescence* depauperate and damaged, but apparently an erect, very slender, subsimple panicle very short or up to 15 cm long ; *secondary panicles* few, suberect, bracteate, upper subapproximate, lower more distantly spaced, on 1-2 more or less exserted peduncles. *Rhachis* hispidulous-villous. *Spikes* 7-10 mm long, few-flowered, male part longer than the female. *Bracts* mostly much smaller than the leaves, lower sometimes foliaceous, otherwise subherbaceous, mostly longer than their secondary panicles, sheathing. *Bracteoles* glumiform. *Female glumes* oblong-lanceolate, deeply cymhiform, apex acute or subacute, 3-4 mm long, about 2 mm wide, glabrous, nervose, brownish, midrih sometimes shortly excurrent. *Utricles* obovoid or ellipsoid-obovoid, 6-6.5 mm long (utricle proper 2.5-3 *mm* long, beak 3-4 *mm* long), 1.5-1.6 mm broad, multinerved, scarcely *m*arginate, glabrous below, adpressed-hispid above, becoming palulous and brownish, not or scarcely stipitate, suhabruptly beaked; *beak* somewhat inflated at the base, otherwise slender and not tapering, compressed, 3-4 mm long, scarcely marginate, glabrous or nearly so, straigbtish, shortly hilobed ; *mouth* very oblique ; *lobes* straight. *Achene* obovoid, faces flattish ahove, shallowly concave below, 2.25-2.5 *mm* long, 1.25-1.5 *mm* broad, olivaceous with brown angles, very shorlly stipitate, abruptly very shortly heaked. *Style* long, base pyramidally thickened, slighlly discoid-annulate.

Tongking : Chapa, 1800 m., July 1930, *Petelot* 5325 (P) !

### 12. *Carex atrivaginata* Nelmes.

Carex atrivaginata *Nelmes, sp. nov. ; affinis* C. tricophyllae *Nelmes, sed foliis angustioribus dorso nervis glabris, spicis longioribus, glumis femineis brevioribus praecipue differt.* Tongking, *Petelot* 3179.

*Rhizome* elongate, scarcely creeping, clolhed wilh fuscous-spadiceous, shcathing scales. *Stem* erect, obtusely hut distinctly trigo-

Source : MNHN, Paris

uous, 65 cm tall, 3 mm thick below, rigid, smooth, naked in the lower 7-8 cm except at the base, which is clothed with a few thickish, minutely scabrous-hispidulous, fuscous-spadiceous cataphylls up to 6 cm long. *Leaves* 7, situated throughout most of the stem but increasingly farther apart downwards, suberect or slightly spreading, narrowly elliptic, base not or scarcely subpetiolate, apex acuminate and acute, 13-16 cm long, upper 2-3 exceeding the stem, 1-1.3 cm wide, flat, smooth on both surfaces except towards the apex, under-surface septate-nodulose, sheathing; *sheaths* glabrous, no developed appendage at the mouth, lower shining spadiceous below, including the node. *Inflorescence* (immature) an erect, subsimple panicle, 8-10 cm long; *secondary panicles* few, suberect or more spreading, more or less oblong, fastigiate, on scarcely exserted peduncles. *Rhachis* smooth. *Spikes* 10-25 mm long, subdense-flowered, divaricate, male part usually much longer than the female part. *Bracts* (lower) similar to the leaves, uper much reduced, sheathing. *Bracteoles* glumiform, small, squarish, apex sometimes bilobed-emarginate, margins whitish-hyaline, with a long sometimes curved or flexuous, hispidulous-margined awn. *Female glumes* ovate or ovate-acuminate, cymbiform, apex acute or subacute, 2.5-3 mm long, 1.5-2 mm wide, mainly glabrous but often very sparsely hispidulous towards the apex, nervose, dirty white or light brownish, midrib often excurrent in a mucro up to 0.75 mm long. *Utricles* very undeveloped, nerved, hispidulous, including the margins. *Achene* undeveloped.

Tongking : Chapa, ± 1500 m., July 1927, Petelot 3179 (P) !

### 13. *Carex laosensis* Nelmes.

*Carex laosensis* Nelmes in *Kew Bull.* 1939 : 305 (1939) et 1946 : 19, 23 (1946). — Laos, *Kerr* 21, 202.

*Rhizome* and lower part of *stem* unknown ; upper part rigid, angles obtuse, faces concave, 13-27 cm long, 1-2 mm thick, smooth, leafy in the upper part of the stem. *Leaves* 1-4, at nodes 2.5 cm to 10 cm apart, narrowly linear-lanceolate, shortly acuminate, mostly much exceeding the inflorescence, 8-15 mm wide, flattish, smooth on both surfaces, septate-nodulose, sheathing ; *sheaths* scabrid in front especially near the brown, concave mouth, which is convex and cartilaginous. *Inflorescence* an erect, compound, interrupted, oblong panicle, (3.5) 7.5-13.5 cm long, 1-2.5 cm broad ; *secondary panicles* 3-7, single, more or less oblong, upper subapproximate and fastigiate, lower at nodes 2-4 cm apart, rather dense, lower branches often again twice branched, uppermost branches simple spikes, patulous to patent, on scarcely exserted peduncles. *Rhachis* smooth, angles acute to obtuse. *Bracts* foliaceous, upper reduced, all far exceeding the main inflorescence, sheathing. *Spikes* about 5 mm long, male part longer than the female part, dense-flowered, female part very short, few-(about 1-3-) flowered. *Bracteoles* glumiform, more or less square or oblong, very

Source : MNHN, Paris

small, midrib excurrent in a ciliolate-setulose awn, 1-3.5 mm long or more, sometimes bent. *Female glumes* ovate, deeply cymbiform, margins sometimes involute, apex acute to obtuse, 1.5-2 mm long, 1-1.5 mm wide, pale, often with wide brownish erose margins, slenderly nervose, midrib scarcely or up to 0.5 mm excurrent in a minutely setulose mucro. *Utricles* broadly ellipsoid, less often ellipsoid-obovoid, faces flattish, or concave near the base and apex, 4-4.5 mm long, 1 75-2 mm broad, multinerved, marginate, margins setose from base to apex, glabrous, apex usually bent, patulous to patent, dull olive-green to stramineous-green, scarcely stipitate, subabruptly beaked ; *beak* slightly tapering, planoconvex, 1.25-2 mm long, broadly marginate, margins setose, turned at right angles towards the flat ventral side, sometimes slightly twisted, bidentulate ; *mouth* slightly oblique. *Achene* ovoid, ellipsoid, or rhomboid-ellipsoid, angles prominent, faces somewhat concave at base and apex, 2.25-2.8 mm long, 1.6-1.9 mm broad, becoming fuscous, not stipitate, apex truncate. *Style*-base pyramidally thickened.

Laos : Pak Munung, Wieng Chan, in evergreen forest, c. 1200 m., 22 April 1932, *Kerr* 21,202 (BM, K, P) !

### 14. *Carex cataphyllodes* Nelmes.

*Carex cataphyllodes* Nelmes in *Kew Bull.* 1946 : 13, 23 (1946). — Thailand, *Kerr* 10, 371.

Tufted. *Stems* erect, angles prominent, 70-100 cm tall, 2 mm thick below, smooth except just below the rhachis where the angles are scabrid, clothed at the base by withered, dark-veined, elongated cataphylls up to 16 cm long. *Leaves* about 3, erect or suberect, evenly spaced on the stem, none radical, linear-elliptic, 30-45 cm long, 0.5-3 cm wide, uppermost reduced or much reduced, very longly attenuated, lower tapering below into a long, tightly conduplicate, petiolar basal part, upper tapering below but scarcely petiolar, blades flat, glabrous on both surfaces, 2 upper usually exceeding the inflorescence, slenderly septate-nodulose, sheathing. *Inflorescence* a simple, continuous, ovoid or ellipsoid panicle of 7-10 branches, 6.5-19 cm long and about 4.5 cm broad ; *branches* patulous to patent, each bearing 7-14 spikes. *Rhachis* of the primary inflorescence and branches densely scabro-hispidulous, angles acute, prominent. *Bracts* glumiform and auricled below, subherbaceous to setaceous or aristate and ciliolate-hispidulous above, lowest sometimes subfoliaceous but small, sometimes an empty bract below the panicle, none sheathing. *Spikes* 8-15 mm long, subdense-flowered, mostly patent, male part equalling or slightly longer than the female. *Bracteoles* glumiform, hispidulous above, longly aristate. *Female glumes* oblong-ovate with a very obtuse, subtruncate or rounded apex, 2.5-3 mm long, 1.25-1.75 mm wide, whitish and pellucid, slenderly nervose, midrib excurrent from below the apex, in a smooth or scabro-ciliolate mucro. *Utricles* undeveloped.

Thailand : S. W. Thailand ; Kanburi, Kao Ri Yai, evergreen forest, c. 1200 m., 31 Jan. 1926, *Kerr* 10, 371 (BM, K) !

Source : MNHN, Paris

Sect. 6. **Stramentitiae** (C. B. Clarke) Nelmes
*in Reinwardtia*, 1 : 250 (1951).

[Series] *Stramentitiae* C. B. Clarke in *Journ. Linn. Soc. Bot.* 37 : 4 (1904).

*Secondary panicles* usually single. *Spikes* numerous, rarely few. *Cladoprophylls* utriculiform, rarely vestigial, apex sometimes bilohed. *Female glumes* often pale. *Utricles* distinctly trigonous, angles prominent, less commonly subinflated, multinerved, mouth often dorsally oblique. *Achene* usually ellipsoid or rhomboid-ellipsoid, angles prominent, apex sometimes discoid-annulate. *Style*-base thickened, often pyramidal, sometimes discoid-annulate.

Inflorescence reduced to 1-4 spikes ; bracts not sheathing the stem ..... 22. *C. tricephala.*
Inflorescence composed of numerous spikes ; at least the lower bracts sheathing the stem :
  Upper secondary panicles binate or ternate :
    Leaves 15-25 mm wide, longitudinal rows of minute bristles on the under-surface ..... 20. *C. setulifolia.*
    Leaves 4-9 mm wide, under surface without rows of bristles ..... 19. *C. perakensis.*
  Upper secondary panicles single :
    Glumes castaneous or dark reddish-brown :
      Leaves 20-25 mm wide ; spikes 5-7 mm long.. 15. *C. balansae.*
      Leaves 5-10 mm wide ; spikes 5-15 mm long. 27. *C. dietrichiae.*
    Glumes whitish, sometimes tinged golden or brownish :
      Glumes hispidulous or setulose, at least above :
        Leaves 6-12 mm wide ; spikes 7-17 mm long ; utricles 6-8 mm long ..... 18 *C. leucostachys.*
        Leaves 12-20 mm wide ; spikes 4-10 mm long ; utricles 3.75-6 mm long :
          Spikes 4-7 mm long ; female glumes 2.75-3 mm long, mucronulate ; utricles 3.75-4.25 mm long, beak 1-1.5 mm long ..... 21. *C. jeanpertii.*
          Spikes 5-10 mm long ; female glumes about 2 mm long, aristate ; utricles 5-6 mm long, beak 2-3 mm long.... ..... 16. *C. spatiosa.*
      Glumes glabrous :
        Leaves 20-32 mm wide ..... 23. *C. callista.*
        Leaves 5-22 mm wide :
          Spikes 10-22 mm long (leaves 5-14 mm wide) 26. *C. indica.*
          Spikes 4-15 mm long :
            Spikes 5-15 mm long (leaves 6-20 mm wide)..... ..... 24. *C. stramentitia.*
            Spikes 4-8 mm long :
              Leaves 12-22 mm wide ; female glumes 3-3.5 mm long; utricles 4.25-4.75 mm long (spikes about 8 mm long) ..... 25. *C. sychnostachya.*

Source : MNHN, Paris

Leaves 6-8 mm wide ; female glumes 1.5-2 mm long ; utricles 3.75-4 mm long (spikes 4-8 mm long).... ..... 17. *C. plagiostoma.*

While the very wide-leaved species in earlier sections are more numerous here than in Malaysia, this mid-*Indocarex* group has about held its own in numbers though partly composed of different species. The same is true of the following small Sect. *Cruciatae*, but the final section of *Indocarex* (excepting the *Polystachyae* which stand rather apart from other *Indocarices*) is in Indo-China represented by a mere two species in place of Malaysia's sixteen.

### 15. *Carex balansae* Franch.

*Carex balansae* Franch. in *Nouv. Arch. Mus. Paris*, 3 sér. 8 : 258 (1896) ; C. B. Clarke, 11 ; Kukenth., 265 ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 189 (1912) ; Nelmes in *Kew Bull.* 1946 : 21, 22 (1946). — Tongking, *Balansa* 2828.

Loosely tufted. *Stem* erect or suberect, rigid, 126 cm tall, 1.75-2.75 mm thick, smooth below, sparsely adpressed-hispidulous towards the inflorescence, clothed at the base by the fuscous fibrous remains of older leaves. *Leaves* mostly subbasal but 2 widely spaced higher on the stem, mostly very long but shorter than the stem, 2-2.5 cm wide, flat, septate-nodulose above, acuminate at the apex, with fuscous nerves on the back of the basal leaves ; *sheaths* dark brown and hispidulous at the mouth. *Inflorescence* a compound, continuous panicle, more or less elliptic in outline, 24.5 cm long, up to 8.5 cm broad ; *secondary panicles* 5-6, single, on longly exserted peduncles, upper sessile or subsessile, lower at nodes rather distant from one another, upper subapproximate to contiguous, lower branches again branched into several simple spikes, upper branches in the form of simple spikes, all rather lax, branches and spikes mostly patent ; *peduncles* stoutish, densely rufous-hispidulous. *Rhachis* densely rufous-hispidulous, distinctly angled. *Bracts* of the 2 lower secondary panicles foliaceous, shortly to longly sheathing, exceeded by to about equalling the stem ; *sheaths* pale- or rufous-hispidulous ; upper bracts much reduced, not sheathing. *Spikes* mostly 5-7 mm long, male part dense-flowered, equalling to slightly longer than the female part, which is few- but subdense-flowered. *Bracteoles* glumiform, small, rufous-hispidulous, midrib excurrent in a curved, hispidulous awn, 2-4 mm or more long. *Female glumes* ovate or oblong-ovate, cymbiform, apex obtuse or very obtuse, rarely subacute, 2.5-4 mm long, 1.5-2 mm wide, scurfy-hispidulous to glabrous, reddish-brown, strongly nervose, midrib and 2 contiguous nerves coalescing above and excurrent in a rufous-hispidulous awn 0.5-1.5 mm long. *Utricles* ellipsoid, 4-5 mm long, 1.6-1.8 mm broad, strongly multinerved, narrowly marginate, sometimes glabrous, sometimes with scurfy and rufous-hispidulous patches, especially along the margins, straight, becoming patent, base spongy, apex subabruptly beaked ; *beak* slightly tapering, flattened

Source : MNHN, Paris

above, 1.5-2 mm long, narrowly marginate, sparsely hispid-margined, bent; sometimes twisted, palish, bidentulate. *Achene* ellipsoid or rhomboid-ellipsoid, faces concave with a flat middle part, 3-3.25 mm long, 1.6-1.8 mm broad, becoming blackish with a pale base and apex, not stipitate, apex scarcely beaked. *Style*-base slightly thickened.

Tongking : forests near the left bank of the Black river at Cho-bo, 15 Nov. 1887, *Balansa* 2827 (P) ! ; forests of Mt. Bavi, near the pagoda of Dein-Touan, April 1888, *Balansa* 2828 (K, P) !

Differing from all other known *Indocarices* in its densely rufous-hispidulous rhachis and peduncles of the secondary panicles. There are sometimes rufous-hispidulous patches, too, on the utricles especially near the margins.

### 16. *Carex spatiosa* Boott.

*Carex spatiosa* Boott, Illustr. 2 : 86, t. 246 (1860) ; C. B. Clarke, 12 ; Kükenth., 265 ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 188 (1912) ; Nelmes in *Kew Bull.* 1946 : 21, 23 (1946). — Annam, *Gaudichaud* 67.

*Tufted. Stem* erect, obtusely trigonous, 60-80 cm tall, 1.5-2 mm thick, smooth, including much of the main rhachis, striate. *Leaves* basal and subbasal, several, and sometimes on the stem above, 37-90 cm tall, 12-20 mm wide, flat, apex longly acuminate, narrowing below ; *sheaths* short, membranous in front. *Inflorescence* a compound, interrupted, erect panicle, 15.5-33 cm long ; *secondary panicles* 3, single, oblong to pyramidal in outline, erect, 3-7.5 cm long, 1.5-5 cm broad, all rather longly separated, lowest sometimes remote, rather lax, sometimes several lower branches again branched into 1-several spikes, upper branches shortly peduncled or sessile spikes, subpatent to patent, 2 lower panicles on longly exserted peduncles ; *peduncles* with angles sparsely hispidulous. *Rhachis* of the secondary panicles acutely angled, whitish-hispidulous. *Bracts* of the lower panicles foliaceous, middle bract subfoliaceous, much reduced, both rather longly sheathing, uppermost bract glumiform, pale, not sheathing. *Spikes* 5-10 mm long, erect to subpatent, male part usually rather longer than the female part which is few-flowered. *Bracteoles* glumiform, minutely adpressed-hispidulous, whitish-erose round the very obtuse apex, midrib excurrent in a curved, hispidulous awn, usually 4 mm or more long. *Female glumes* oblong-ovate, cymbiform, margins involute below, apex very obtuse to bilobed-emarginate, about 2 mm long, 1-1.2 mm wide, nervose, adpressed-hispidulous, dirty-white suffused light brownish, margins ciliolate-erose round the apex, midrib and two adjacent nerves coalescing above and excurrent in a hispidulous awn, 1-3 mm long. *Utricles* ellipsoid-obovoid, subinflated, 5-6 mm long, 1.25-1.5 mm broad, strongly multinerved, scarcely or narrowly marginate, usually sparsely scurfy-adpressed-hispidulous, especially above, but sometimes glabrous, straight to much bent or curved, patulous to patent, base spongy and slightly bulbous, not stipitate, apex subgra-

Source : MNHN, Paris

dually beaked ; *beak* subterete, 2-3 mm long, scarcely marginate, sparsely hispidulous, sometimes twisted, bilobed ; *mouth* very obliqne. *Achene* ellipsoid-obovoid, angles prominent, faces coneave, 2.5-2.75 *m*m long, about 1 mm broad, light to dark brown, not stipitate, very shortly beaked. *Style*-base much, sometimes bulbously, thickened.

Tongking : forests, left bank of Blaek River, near Cho-bo, *Balansa* 2827 (K, P) !

Annam : Tourane, *Gaudichaud* 67 (P.) !

The following imperfect specimen may belong here.

Annam : 40 km. north of Tourane, 10 Aug. 1927, *Clemens* 4210 (K, P) !

### 17. *Carex plagiostoma* Nelmes.

*Carex plagiostoma* Nelmes in *Kew Bull.* 1946 : 19, 23 (1946). — Tongking, *Balansa* 2819.

Loosely tufted. *Rhizome* short. *Stem* erect, 48 cm tall, 1.3-1.6 mm thick, smooth, including the rhachis, elothed at the base, below the leaves, by the long blackish fibrous remains of old leaf-sheaths. *Leaves* subbasally rather crowded and 1 higher on the stem, mostly slightly exceeding the apex of the inflorescence, 6-8 mm wide, flat, not septate-nodulose, nerves on the back of the sheathing base fuseous, apex longly attenuated ; *sheaths* of the lower leaves with glabrous, membranous mouths. *Inflorescence* a compound, interrupted, narrow, ereet paniele, 18 cm long ; *secondary panicles* about 4, single, pyramidal in outline, erect, 3-4 cm long, 2-3 cm broad at the base, upper approximate or subapproximate, lower more distantly spaeed, lax, lower branehes again branched into several simple spikes, upper branehes in the form of simple spikes, branehes and spikes patent, lower on longly upper on shortly exserted peduneles ; *peduncles* slender, smooth. *Rhachis* of the seeondary panieles glabrous below, but hispidulous above on the aeuter angles. *Bracts* foliaeeous, but upper redueed, lower longly upper not to shortly sheathing ; *sheaths* brown and eoneave at the mouth. *Spikes* 4-8 mm long, male part subdense-flowered, equalling or much longer than the female part, which is few-flowered. *Bracteoles* glumiform, apex bilobed-emarginate, 1.5-1.75 mm long, midrib exeurrent in a scaberulous-margined usually eurved awn, whieh is often longer than the bracteole itself. *Female glumes* ohlong with rounded upper corners or oblong-ovate, eymbiform, apex usually bilobed-emarginate, 1.5-2 mm long, 1-1.25 mm wide, nervose, glabrous, milky-white, often tinged golden, midrib exeurrent in a nearly smooth to linely hispidulous awn up to nearly 1 mm long. *Utricles* ellipsoid or rbomboid-ellipsoid, trigonous to subinflated, 3.75-4 mm long, 1-1.25 mm broad, strongly multinerved, scarcely marginate, glabrous, usually mueb eurved but sometimes straightish, becoming patent when mature, base spongy-thickened, not stipi-

Source : MNHN, Paris

tate, apex subgradually beaked ; *beak* gradually tapering, subterete, 1.5-2 mm long, glabrous, sometimes slightly twisted, bilobed ; *mouth* very oblique. *Achene* with prominent angles and concaves faces, except for a rounded ridge running round the middle, giving a rhomboid-ellipsoid shape, 2-2.3 mm long, 1-1.1 mm broad, light purplish-brown, not stipitate nor beaked. *Style*-base slightly bulbous.

Tonkin : forests of Mt. Bavi, below the pagoda of Déin-Touan, 27 March 1887, *Balansa* 2819 (K, P) ! ; Nong Kay, *Thorel* (Exped. Me-Kong, 1866-68) (P)! ; forests to the north of the station of Cho-bo, 15 Nov. 1887, *Balansa* 2811 (P.) !

### 18. *Carex leucostachys* Ridley.

*Carex leucostachys* Ridley in *Kew Bull.* 1928 : 77 (1928) ; Nelmes in *Reinwardtia*, 1 : 251 (1951). — Malay Peninsula, *Md. Nur* 18,912.

Loosely tufted. *Rhizome* short. *Stems* more or less erect, angles prominent, obtuse to subacute, 40-85 cm tall, 2-2.5 mm thick below, smooth below, sparsely to densely scabrid on the angles above, including much of the rhachis, surrounded, below the leaves, by thickish, brown, polished, blackish-nerved cataphylls. *Leaves* basal and subbasal, and 1-2 higher on the stem, lowest short-bladed, upper exceeded by to much exceeding the stem, 6-12 mm wide, flat, septate-nodulose in places, under-surface sometimes covered with pale raised dots or minute bristles, apices shortly to longly attenuated ; *sheaths* loose, brownish, membranous in front, mouth darker brown, often setulose. *Inflorescence* a dense or interrupted, compound panicle, occupying the upper 4 cm to half of the stem ; *secondary panicles* 3-5, sometimes too crowded to be distinguishable, single, more or less oblong, 3-6 cm long, upper crowded to subfastigiate, lower slightly to very distantly separated, lower usually again branched into simple spikes, upper spikes unbranched, lower on rather longly or longly upper on scarcely or shortly exserted peduncles ; *peduncles* slender, smooth, or scaberulous above. *Bracts* of the lower or lowest panicles foliaceous, shorter than to exceeding the stem, longly sheathing, upper bracts subfoliaceous, not or shortly sheathing. *Spikes* cylindric but male part tapering, 7-17 mm long, sublax- or subdense-flowered, male part shorter in the long terminal spikes but in the lateral spikes equalling to longer than the female part. *Bracteoles* similar to the glumes. *Cladoprophylls* with 2 midribs (bilobed), or small and ligulate. *Female glumes* lanceolate, ovate-lanceolate, or oblong with a triangular apex, cymbiform, apex acute, obtuse, subtruncate, or bilobed-emarginate, 4-5.5 mm long, 2-3 mm wide, dirty-whitish, often golden-flushed above, nervose with some nerves golden-brown, glabrous or sparsely hispidulous below, hispidulous above, midrib and 2 adjacent nerves coalescing above and often excurrent from a point below the apex in a hispidulous-margined awn up to 2 mm long. *Utricles* ellipsoid, obovoid, or ellipsoid-obovoid but tapering below, distinctly

Source : MNHN, Paris

angled, 6-8 mm long, 1.5-2.3 mm broad, slenderly multinerved, sometimes ventrally nearly nerveless, nerves sometimes reddish-brown tinged, narrowly marginate, base glabrous, suhadpressed whitish-hispidulous above, straight or apex bent, patulous, base spongy, not stipitate, suhgradually to suhahruptly beaked ; *beak* compressed or subterete, gradually tapering, 2.75-3 mm long, narrowly marginate, margins hispidulous, palish, bilobed ; *mouth* dorsally oblique ; *lobes* shortish, straight, apex whitish-hyaline, becoming erose. *Achene* ellipsoid, ellipsoid-obovoid, or obovoid with a tapering base, angles prominent, faces flattish or concave helow, 3-4 mm long, 1.5-2 mm broad, beeoming blackish, not or very shortly pale-stipitate, apex abruptly beaked ; *beak* very short, bent, apex slightly annulate. *Style*-base thickened, minutely whitish-hispidulous. *Stigmas* dark reddish-hrown, sharply contrasting with lhe pale spikes.

Tonkine : Chapa ; Fan Si Pan, ± 1500 m, July 1931, *Petelot* 6133 (P) !

Malaysia.

When I was preparing descriptions of *Carex leucostachys* and *C. perakensis* for my revision of the genus in Malaysia they seemed sufficiently distinct to treat as species. The above-eited Paris material collected in Indo-China has narrowed the gap and one is not now quite so sure of their status, but the evidence for merging the two into one species is nol yet quite clear.

### 19. *Carex perakensis* C. B. Clarke.

*Carex perakensis* C. B. Clarke in Hook. f., Fl. Brit. Ind. 6 : 720 (1894) ; C. B. Clarke, 9 ; Ridley, Fl. Malay Penins. 5 : 184 (1925) ; Nelmes, 253. — Malay Peninsula, *Wray*.

*Carex wightiana* Nees var. *perakensis* (C. B. Clarke) Kükenth. in Engl. Pflanzenr. IV, 20 : 288 (1909).

Loosely tufted. *Rhizome* elongated, 3-4 mm thick, clothed with brown to fuscous sheathing seales. *Steins* more or less ereet, angles aeute, 58-120 cm tall, 2-2.5 mm thick helow, smooth throughout, or angles sparsely scaherulous towards the apex of the rhachis. *Leaves* spaced throughout the stem, shorter bladed and more aggregated at the base, merging downwards into acuminate, spadiceous to fuscous cataphylls or nearly leafless sheaths, normal leaves long, some exceeding the stem, 4-9 mm wide, flat or flattish, septate-nodulose in places, apices longly aemminate ; *sheaths* dark hrown-or blackish-nerved on the back, front dark brown, membranous, hispidulous above. *Inflorescence* a much interrupted, narrowly oblong panicle, occupying the upper lhird or less of lhe stem ; *secondary panicles* up to 6, lower single or binate, upper binate or ternate, more or less oblong, 2-5 cm long, upper approximate, forming a continuous infloreseence, lower 1-2 rather distant, eomposed of 3-6 simple sessile spikes, lower on longly exserted, upper sessile or on shortly exserted,

Source : MNHN, Paris

peduncles ; *peduncles* slender, smooth or rarely sparsely scaberulous. *Bracts* of the lower panicles foliaceous, exceeding or much exceeding the stem, longly sheathing, upper bracts much reduced, subfoliaceous to glumiform-aristate, shortly sheathing ; *sheaths* membranous, dark-brown, and sometimes bispidulous, at the mouth. *Spikes* 1-1.5 cm long, sublax-flowered, male part about as long as the female or sometimes longer. *Bracteoles* reduced to long-awned glumes. *Cladoprophylls* utriculi-glumiform, about 3.5 mm long, sometimes much smaller and ligulate. *Female glumes* ovate, ovate-oblong, or oblong-obovate, apical part triangular or sublanceolate, cymbiform, apex acute to obtuse, 3.25-4.5 mm long, 1.75-2.5 mm wide, whitish or fulvous with wide whitish margins, golden-brown-nervose, glabrous, or sparsely and minutely hispidulous towards the apex, margins ciliolate-erose, midrib usually excurrent from a point about 0.5 mm below the apex in a ciliolate-hispidulous awn up to 1.5 mm long. *Utricles* ellipsoid, obovoid-ellipsoid, or obovoid but tapering below, angles rather prominent, 4.75-6 mm long, 1.3-1.9 mm broad, multinerved, nerves sometimes reddish-brown towards the base, very narrowly marginate, base glabrous or glabrescent, otherwise densely pale to golden, subadpressed hispidulous, straight or slightly curved, patulous, base spongy, truncate, not stipitate, subgradually narrowing above into a beak ; *beak* conic, 1-2 mm long, narrowly marginate, glabrescent or hispidulous, bilobed ; *mouth* dorsally oblique ; *lobes* short, straight, apex whitish-hyaline, becoming erose. *Achene* obovoid or ellipsoid-obovoid, but longly tapering towards the base, conspicuously angled, faces flattish, 2.75-3 mm long, 1.1-1.8 mm broad, dark brown to blackish, base pale, not stipitate, apex slightly tapering, beaked ; *beak* short or very short, often slightly bent, pale. *Style* slightly thickened at the trigonous, whitish-hispidulous-angled base. *Stigmas* long, dark reddish brown, in striking contrast to the pale spikes.

Tongking : Prov. of Vinh-yen ; Massif of Tam Dao, « reçu le Avril-Mai 1917 », *Eberhardt* 3721 (P) ! ; Massif of Mau Son, Jan. 1925, *Petelot* 1754 (P) ! ; Chapa, 1500 m, Aug. 1927, *Petelot* 3175 (P) ! ibid., clayey talus in forest, ± 1500 m, Aug 1931, *Petelot* 6132 (P) !

Annam : Prov. of Kontum ; Massif of Ngok Pan, granitic soil, 2300 m, 12 Dec. 1946, *Poilane* 35,801 (P) !

Malaysia.

The following specimen differs somewhat in appearance from *C. perakensis* but is placed here until it is better known.

Annam : Prov. of Kontum ; between Dak Dru Dak and Dak Bon Khong, west of Dak Gley, good clayey schistose soil, very wet climate, foggy and humid, 1000-1100 m, 30 Jan. 1947, *Poilane* 32,891 (P) !



Source : MNHN, Paris

### 20. *Carex setulifolia* Nelmes.

Carex setulifolia *Nelmes, sp. nov. ; affinis* C. perakensi *C. B. Clarke, sed foliis latioribus dorso setulis lineatim regulariter dispositis longitudinaliter adpresso-hispidulis, glumis femineis longioribus praecipue differt.* — Tongking, *Petelot* 5504.

Probably loosely tufted. *Rhizome* short. *Stem* erect, 105 cm tall, 4-5 mm thick below, smooth, even on the rhachis and most of its branches. *Leaves* basal and subbasal, with 1 higher on the stem, long or very long but shorter than the stem, 1.5-2.5 cm wide, flat, upper surface glabrous, slenderly septate-nodulose, under-surface densely covered with pale minute bristles which occur mostly in longitudinal rows between the nerves, apices longly attenuated ; basal *sheaths* purplish-spadiceous, fraying into fibres. *Inflorescence* an interrupted compound slender panicle, occupying the upper half of the stem ; *secondary panicles* about 12, lowest single, others binate and ternate at about 5 nodes, more or less oblong, 4-8 cm long, upper approximate and fastigiate, perhaps slightly cernuous, lower distant, upper spikes unbranched, lower sometimes again branched into several simple spikes, lower on longly to very longly, upper on scarcely to rather longly, exserted peduncles ; *peduncles* slender, smooth, or upper scaberulous above. *Bracts* of the lower panicles foliaceous, exceeded by to about equalling the apex of the whole inflorescence, longly sheathing, upper bracts subfoliaceous, shortly sheathing. *Spikes* 7-15 mm long, subdense-flowered, male part shorter in the long terminal spikes and longer in the short lateral spikes, than the female part. *Bracteoles* similar to the glumes but longer awned. *Cladoprophylls* often bilobed. *Female glumes* mostly more or less oblong with rounded to subtruncate or bilobed-emarginate apices, sometimes oblong-ovate, cymbiform above, 3.75-5.5 mm long, 1.5-2.3 mm wide, glabrous, fulvous, or pale with reddish streaks, nervose, midrib and 2 adjacent nerves coalescing above and usually excurrent from a point below the apex in a hispidulous-margined awn up to 2 mm long. *Utricles* narrowly ellipsoid, tapering below, distinctly angled, 5.5-6 mm long, 1-1.3 mm broad, multinerved, narrowly marginate, densely or subdensely whitish-hispidulous above, glabrous or glabrescent below or at the base, usually curved but sometimes straightish, patulous, shortly cuneate-stipitate, gradually or subabruptly beaked ; *beak* tapering, plano-convex, grooved down the black, 1.5-2 mm long, scarcely or narrowly marginate, sparsely hispidulous below, glabrous or glabrescent above, bidentulate ; *mouth* not or scarcely oblique ; *teeth* lobe-like, straight. *Achene* ellipsoid or oblong-ellipsoid, distinctly angled, 3-3.5 mm long, 1-1.1 mm broad, becoming dark brown, not stipitate, subabruptly beaked ; *beak* cylindric, pale or pale above, straight or straightish, 0.2 - 0.5 mm long. *Style* - base somewbat thickened. *Stigmas* thickish.

Tongking : Chapa ; c. 1500 m, July 1924, *Petelot* 1649 (BOG, P) ! ; col of Lo ? Qui ? Ho, c. 2000 m, Sept. 1931, *Petelot* 5504 (P) !

Source : MNHN, Paris

### 21. *Carex jeanpertii* E. G. Camus.

*Carex jeanpertii* E. G. Camus in Lecomte, *Not. Syst.* 1 : 295 (1910) et in Lecomte, Fl. Gén. Indochine, 7 : 185 (1912) ; Nelmes in *Kew Bull.* 1946 : 21, 23 (1946). — Tongking, *Bon* 5361.

Probably tufted. *Rhizome* short, clothed with the fibrous remains of sheathing scales. *Stem* erect, 67 cm tall, nearly 2 mm thick below, smooth except the scabrulous angles of the apex of the rhachis and its branches. *Leaves* basal and subbasal, long but shorter than the stem, 15-17 mm wide, flat, slightly septate-nodulose in places, apices attenuated, lower leaves merging into a few reddish-brown cataphylls ; *sheaths* brownish, membranous in front. *Inflorescence* an erect or suberect, simple, slender, interrupted panicle, occupying the upper 40 cm of the stem ; *secondary panicles* 3, single, more or less oblong, 8-9 cm long, 5-15 mm broad, all distant from one another, lax, lower branches usually bearing 2-4 simple spikes, upper branches in the form of simple sessile spikes, erect to patulous, the 2 lateral panicles on longly exserted *peduncles* which are rather slender, smooth or scabrulous. *Bracts* foliaceous but upper reduced, mostly failing to reach the apex of the stem, longly to shortly sheathing. *Spikes* 4-7 mm long, male part dense - female few-flowered. *Bracteoles* not distinguishable from the glumes. *Cladoprophylls* reduced and vestigial. *Female glumes* ovate or oblong-ovate, cymbiform to flattish above, apex very obtuse to rounded, 2.75-3 mm long, about 2 mm wide, glabrous or glabrescent below, sparsely setulose above, fulvous-brown, with wide whitish-hyaline erose-ciliolate margins, especially round the apex, strongly nervose, midrib and 2 strong adjacent nerves coalescing above and excurrent in a smooth or sparsely hispidulous mucro, 0.2-0.3 mm long. *Utricles* broadly ellipsoid, obtusely angled, 3.75-4.25 mm long, about 2 mm broad, slenderly and obscurely pluri- to multinerved, narrowly marginate, setulose, straight or slightly incurved, becoming patulous to subpatent, base spongy-thickened, not stipitate, subabruptly beaked ; *beak* tapering, compressed, 1-1.5 mm long, narrowly marginate, hispidulous-margined, otherwise glabrous or glabrescent, usually rather curved, sometimes slightly twisted, bidentate ; *mouth* not or scarcely oblique ; *teeth* lobe-like, straight. *Achene* ellipsoid or rhomboid-ellipsoid, apex truncate, angles prominent, faces shallowly concave, 2.2-2.8 mm long, 1.8-1.9 mm broad, becoming blackish, scarcely or very shortly stipitate, not or scarcely beaked. *Style* pyramidally thickened above a discoid base.

Tongking : West Tongking ; near Ninh-binh, *Bon* 5361 (P) !

In one utricle of this species examined there was a flattened scale-like rhachilla about as long as the achene.

### 22. *Carex tricephala* Boeck.

*Carex tricephala* Boeck. in Flora, 58 : 263 (1875) ; Kükenth., 289 ; Nelmes, 256. — Madura, *Zollinger* 1778.

Source : MNHN, Paris

*Carex thorelii* E. G. Camus in Lecomte, *Not. Syst.* i : 295 (1910) ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 196 (1922). — Cambodia, *Thorel* 2218.

*Carex plesiocephala* Turrill in *Kew Bull.* 1910 : 385 (1910). — Upper Burma, *Lace* 4235 ; Thailand, *Kerr* 1221.

*Rhizome* short, horizontal, covered with the fuscous, fibrous remains of scales. *Stems* erect, angles obtuse below, narrowly winged above, especially just below the spikes, 13-50 cm tall, 0.6-1 mm thick below, 1-1.75 mm thick in the winged upper part, smooth below, angles densely pale hispid-scaberulous just below and on the rhachis, clothed at the base with the fuscous fibrous remains of cataphylls and old leaf-sheaths. *Leaves* mostly basal or subbasal, 1-2 on the stem above, shorter than to much exceeding the stem, 3.5-11 mm wide, flat, slightly septate-nodulose, apices shortly attenuated ; *sheaths* of the basal leaves membranous in front, those of the stem leaves longer and tighter, membranous only at the dark-brown, truncate, sometimes minutely pubescent mouth. *Spikes* 1-3 (4), 6-10 (12) mm long and nearly as broad, terminal larger than the others, the uppermost lateral spikes, sometimes absent or represented by a bract, branching from near the base of the terminal and forming a pyramidal or subglobose head, lowest spike 2-5 cm distant, male part about as long as but much more slender than the female. *Bract* of the lowest 1-2 spikes foliaceous, much exceeding the stem, upper bracts much reduced, subherbaceous or glumiform with a very long hispidulous awn, not sheathing but with short ciliolate-hispidulous pale auricles ; *bracteoles* glumiform, broadly oblong to suborbicular, with a long, flattish, setulose-margined awn. *Female glumes* oblong-ovate to more or less oblong, apex subobtuse to very obtuse, flattish to cymbiform, 2.5-4 mm long, 1.5-1.75 mm wide, distinctly nervose, densely whitish-subadpressed-setulose, milky-white to brownish, margins whitish-hyaline, ciliolate-erose, midrib and 2 adjacent nerves coalescing above and excurrent in a minutely setulose awn, 0.5-1 mm long. *Utricles* ellipsoid, distinctly angled, 4.25-5.75 mm long, 1.8-2 mm broad, multinerved, densely hispidulous-pilose above, narrowly marginate, becoming patulous to subpatent, not or very shortly stipitate, subgradually to subabruptly beaked ; *beak* conic below, compressed-cylindric above, less pubescent towards its bidentate apex, 1-2 mm long ; *mouth* slightly dorsally oblique ; *teeth* short, straight. *Achene* ellipsoid to obovoid-ellipsoid, angles very prominent, faces flattish to concave, 2.5-3 mm long, 0.7-2 mm broad, angles becoming dark reddish-brown and faces cinereous, tapering to a scarcely stipitate base, apex slightly rounded, scarcely or very shortly and stoutly beaked. *Style*-base pyramidally thickened, sometimes subdiscoid-annulate, overlapping the apex of the achene.

Thailand : N: Thailand ; Chiengmai, Doi Sutep, mixed jungle, foot of Doi Sutep, 330 m., 16 June 1910, *Kerr* 1221 (BM, K)! ; ibid., 13 Sept. 1914, *Kerr* 3372 (BM, K) ! — S. W. Thailand ; Kanburi, Sai

Source : MNHN, Paris

Yoke, ± 50 m., forest, 1 Aug. 1928, *Marcan* 2368 (BM, K) ! Dawn Tan, ? Nakaun ? Panan, deciduous forest, ± 100 m., 15 May 1932, *Kerr* 21,462 (K) !

Laos : Nam Pat, 24 April 1892, *Prince Henri d'Orléans* (P) !

Cambodia : slopes of Mt. Oudon, Khon Island, Stung-treng, July to Sept., 1866-68, *Thorel* (P) ! ; Mt. Schrion, 200 m., 18 April 1870, *Pierre* (P) ! ; Mt. Cherreo, *Thorel*.

Krong-Pha, 23 June 1921, Hayata (P) !

Upper Burma, Java (Madura).

There is a note on the peculiar distribution of this species following its description in my revision of *Carex* in Malaysia (Reinwardtia, 1 : 257 : 1951).

### 23. *Carex callista* Nelmes.

Carex callista *Nelmes, sp. nov. ; affinis* C. stramentitiae *Boott ex Boeck., sed foliis latioribus, spicis brevioribus, glumis pallidioribus praecipue differt.* — Lower Burma, *Maung Ba Pe* 12, 857.

Loosely tufted. *Rhizome* very short. *Stems* erect, (40-) 59-65 cm tall, (2-) 3-4 mm broad, smooth below the rhachis, surrounded, below the leaves, by a few withered leaf-sheaths. *Leaves* basal and subbasal, rarely higher on the stem, longer to much longer than the stem, (2-) 2.5-3.2 cm wide, flat, slenderly septate-nodulose in places, apices attenuated ; *sheaths* light brown and membranous in front, fuscous-nerved on the back. *Inflorescence* a compound, continuous or interrupted panicle, occupying the upper (14-) 16-26 cm of the stem ; *secondary panicles* 2-4, single, erect or suberect, oblong-elliptic to lanceolate in outline, 6.5-10 cm long, 2.5-6.5 cm wide, upper at subapproximate nodes, lowest distant, subdense, upper on peduncles scarcely or shortly, lower on peduncles longly or very longly, exserted, middle and lower branches again branched, lower twice, into simple spikes, upper branches in the form of simple spikes ; *peduncles* slender, smooth to wholly scabrid. *Rhachis* of the secondary panicles, and of the main panicle above, densely scabrous-hispidulous. *Bracts* (lower) foliaceous and much exceeding, upper subfoliaceous and often exceeded by, the stem, upper scarcely or shortly lower longly or very longly sheathing ; *sheaths* membranous at the mouth, often fuscous-nerved. *Spikes* (immature) 4-7 mm long, subdense-flowered, patulous to subpatent. *Bracteoles* glumiform, with long, sometimes curved, hispidulous-margined awns. *Cladoprophylls* with a bilobed, ciliolate apex. *Female glumes* (immature) more or less oblong or ovate-oblong, shallowly cymbiform, apex rounded or more or less truncate, ciliolate, 2-2.5 mm long, about 1 mm wide, glabrous, pallid, with wide thinner margins, not visibly nervose, except the greenish midrib and 2 closely adjacent nerves which, coalescing above, are excurrent in a tapering, sparsely hispidulous-margined, straight or slightly curved awn, 0.75-1.5 mm long. *Utricles* quite undeveloped.

Source : MNHN, Paris

Lower Burma : Tenasserim ; (comm. *Col. Broome.* 6/79) 42 (K)! ; Salween District ; Mewaing Headwaters, loamy soil, isolated, under shade, 18° N, 97° W, 675 m., 22 Dec. 1928, *Po Chin* 6064 (K)! ; Tavoy ; Nat gyi zin, Kaleinaung Reserve, 5 Dec. 1927, *Maung Ba Pe 4857* (K)! ; Thaung yin Division, That Lut Pa ya Toung, 5 Dec. 1931, *Maung Ba Pe* 12,857 (K) !

This handsome species, with its beautiful lax panicles of pallid spikes, seems so strikingly distinct that I have no qualms about giving it a name, in spite of the absence of fruiting specimens.

### 24. *Carex stramentitia* Boott ex Boeck.

*Carex stramentitia* Boott ex Boeck. in *Linnaea*, 40 : 351 (1876) ; C. B. Clarke, 9 ; Kükenth., 264 ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 188 (1912) ; Nelmes, 267. — India, *Hook. f.*

Loosely tufted. *Rhizome* short, clothed with dark-nerved sheathing scales or their fuscous fibrous remains. *Stems* more or less erect, obtusely but distinctly angled, 30-127 cm tall, about 1.5-3,5 mm thick below, smooth below the inflorescence except below its lowest node, where the surface is sometimes bristly, and below the stem leaves where one of the three flat sides is sometimes sparsely bristly, clothed, below the leaves, by fuscous fibrous remains of old leaf-bases. *Leaves* basal and subbasal, and sometimes 1-2 on the stem above, some shorter, or equalling, but others much exceeding, the stems, 6-20 mm wide, flat to strongly plicate and revolute, sometimes septate-nodulose, apices longly attenuated ; *sheaths* brown, membranaceous in front, fuscous-nerved on the back. *Inflorescence* a compound, much interrupted, narrow panicle, occupying the upper 9-36 cm of the stem ; *secondary panicles* 2-4, single, suberect, more or less lanceolate, oblong, rhomboid or pyramidal in outline, dense, 2-9 cm long, 1.5-6.5 cm thick, upper shortly separated to rather distant, lower distant, from one another, upper on peduncles scarcely or very shortly, lower on peduncles shortly to longly or very longly, exserted, lower branches again branched (lowest sometimes twice) into several simple spikes, upper branches simple spikes, becoming patulous to patent ; *peduncles* smooth to scaberulous, slender. *Rhachis* of the main inflorescence scaberulous on the angles and bristly on the surface just below the nodes ; *rhachis* of the secondary panicles densely hispid on angles and surface, except below on the lower ones. *Bracts* foliaceous but upper reduced, lowest much, upper little, exceeding the stem, sheathing ; *sheaths* of the lower long or very long and the upper short or very short, glabrous below, hispidulous in front or at the membranous mouth, nodes brown. *Spikes* 5-15 mm long, female part 1- few-flowered, rather shorter than the male part. *Bracteoles* glumiform, midrib excurrent in a long, often curved and flexuous, hispidulous-margined awn. *Female glumes* oblong, oblong-ovate or subtriangular, deeply cymbiform above, margins sometimes involute, apex

Source : MNHN, Paris

obtuse, rounded, truncate or bilobed-emarginate, 2-2.75 mm long, 1.3-2 mm wide, glabrous, rarely sparsely hispidulous above, dirty whitish, slenderly nervose, midrib and two adjacent nerves, coalescing above, excurrent from a point on the back below the apex in a sparsely hispidulous-margined awn, 0.75-2 mm long. *Utricles* rhomboid-ovoid or rhomboid-ellipsoid, but curved-tapering below into a spongy, cylindric-butbous or cuneate-cylindric basal part, angles prominent, faces ftattish, 4-5 mm long, 1.5-1.9 mm broad, not marginate, multinerved, glabrous, margins rarely very sparsely hispidulous above, straight to slightly recurved, patulous to subpatent, not stipitate, subabruptly beaked ; *beak* often slightly inflated at the base, compressed above, gradually tapering, 1.5-2 mm long, incurved-marginate on the ventral side, glabrous, rarely extremely sparsety scaberulous-margined, usually straight but sometimes stightly curved and/or twisted, palish, subentire ; *mouth* very dorsatly oblique. *Achene* rhomboid-ellipsoid, angles prominent, faces concave, especially below, 2.25-3 mm long, 1.5-1.8 mm broad, straight or very slightly curved, becoming warm brown, curved-tapering below into a stout, scarcely stipitate basal part, erostrate at the apex. *Style* thickened below into a discoid-annulate-triangular base.

Lower Burma : Tenassarim ; Amherst District, Dawn Hills near Malayit, April 1927, *Shwe Nyan Tha* 4 (K) !

Thailand : N. Thailand ; Lampang, Mae Moi, gregarious on open hill slopes in deciduous Dipterocarp forest, *Winit* 833 (K) !

Laos : Nong-Kay, *Thorel.*

Annam : vicinity of Hué, Jan.-May 1927, *Squires* 283 (BM, K)! ; Sapoum Prov., Haut Douai, south agriculturat station of Blao, in large forest, 1000-1200 m., 22 Feb. 1933, *Poilane* 22,041 (P) !

India, Java.

### 25. *Carex sychnostachya* Nelmes.

*Carex sychnostachya* Nelmes in *Kew Bull.* 1939 : 658 (1939) et in *Kew Bull.* 1946 : 20, 23 (1946). — Thailand, *Kerr* 5703.

*Rhizome* longly creeping, clothed with sheathing scales. *Stems* erect or suberect, rigid, faces rather concave, about 40 cm tall, about 1.5 mm thick below, almost smooth, angles scaberulous above, surrounded at the base, below the leaves, by elongated almost leaftess sheaths the lower of which are reduced to fuscous fibres. *Leaves* linear-lanceolate, apex usually not longly attenuated, subbasal except 1 higher on the stem, shorter to longer than the stems, 12-22 mm wide (stem leaf 2-8 mm wide), flat above, conduplicate-petiolate towards the base, pseudo-petioles greenish-white with brownish to blackish nerves, scarcely to shortly sheathing. *Inflorescence* à compound, interrupted, erect to suberect panicle, about 8 cm long ; *secondary panicles* 3-4, single, more or less ovoid-pyramidal, about 2 cm long,

Source : MNHN, Paris

1.5-2 cm broad, upper contiguous to subapproximate, lower more distantly spaced, dense, uppermost sessile, remainder on shortly to longly exserted peduncles, each composed of about 5 short sessile patent branches, most of which are composed of 3-5 crowded, stellately spreading, simple spikes, rarely the branches themselves reduced to simple spikes, forming dense heads ; *peduncles* slender, scabrid. *Rhachis* of the main inflorescence obtusely angled, smooth or scaberulous, of the secondary panicles with acute angles, which are densely setulose-scabrid. *Bracts* of the lower secondary panicles subfoliaceous, exceeding their panicles, longly sheathing, upper bracts reduced to long-awned glumes ; *sheaths* brown at the deeply concave mouth. *Spikes* about 8 mm long, male part dense-flowered, much longer than the few-flowered female part *Bracteoles* glumiform, the midrib excurrent in a long, flattish, setulose-margined, sometimes curved awn. *Female glumes* ovate, oblong-ovale, or ovale-lanceolate, cymbiform, apex acute to obtuse, 3-3.5 mm long, 1-2 mm wide, glabrous, whitish splashed pale brown, margins becoming erose, midrib excurrent in a smooth or slightly scaberulous mucro, 0.3-0.6 mm long. *Utricles* broadly ellipsoid, obovoid, ellipsoid-lanceolate, or obovoid-lanceolate, angles very prominent and obtuse, the 3 faces somewhat concave, 4.25-4.75 mm long, 1.25-1.5 mm broad, multinerved, narrowly marginate, subadpressed-setulose, straight, patulous to patent, scarcely stipitate, subabruptly beaked ; *beak* tapering, flattish or convex-canaliculate, about 2 mm long, narrowly marginate, often curved and sometimes twisted, whitish, hidentate ; *mouth* extremely oblique ; *teeth* straight or slighlly converging. *Achenes* ellipsoid or rhomboid-ellipsoid, conspicuously angled, faces concave, especially above and below, about 2 mm long, 1.1-1.5 mm broad, golden brown, not or scarcely stipitate, tapering above to the apex which suddenly and slightly broadens to become truncate-annulate. *Style*-base thickened-pyramidal.

THAILAND : N. Thailand ; Petchabun, about 200 m., on bank of dry stream in evergreen forest, 28 March 1922, *Kerr* 5703 (BM, K) !

Readily distinguished from its allies by its secondary panicles forming dense heads.

There is another specimen which appears to be this species but it is too young for certain determination (N. Thailand ; Nakawn-Tai, 300 m., frequent in damp places, *Hosseus* 723, BM, K !)

This Hosseus plant came to Kew for determination, and, from the evidence of the Kew Plant Lists, Hosseus was informed that it was probably a *Carex* but too young for one to be sure of its identification (« Carex juvenilis »). This information was apparently passed on by Hosseus to Lecomte, but in such a manner as to lead Lecomte to believe that the word juvenilis was suggested as the specific epithet for the plant. It was accordingly published : *Carex juvenilis* C. B. Clarke ex Lecomte, Not. Syst. 2 : 207 (1912), but because this combination is based upon a misunderstanding it is here treated as illegitimate, and owing to its juvenility the plant is placed here with considerable diffidence.

Source : MNHN, Paris

### 26. *Carex indica* L.

*Carex indica* L., Manl. II, 574 (1771) ; Boolt, Illuslr. 2 : 87, II. 250, 252, 253 (1860) ; C. B. Clarke, 8 ; Kükenth., 262, 263 = fig. 40 ; Lecomte in Fl. Gén. Indo-Chine, 7 : 187 (1912) ; Nelmes, 271. — « India orientalis».

Loosely tufted. *Rhizome* short. *Stems* erect, angles prominent, obtuse, faces flattish, 60-100 cm long, about 3.5 mm thick below, smooth, surrounded at the base by calaphylls or leafless-sheaths and a fuscous mass of their fibrous remains. *Leaves* mostly basal, but several spaced on the stem, some much longer than the stems, 5-14 mm wide, flattish-plicate, margins sometimes slightly revolute, apices longly attenuated; *sheaths* brown to fuscous on the back, often blackish-nerved. *Inflorescence* a compound interrupted panicle, occupying about the upper half of the stem ; *secondary panicles* 3-7, single, more or les oblong to pyramidal in outline, erect, 3.5-10 cm long, 2-6 cm broad, upper subapproximate and continuous to rather distantly, lower distantly spaced, lax to subdense, lower branches again branched into 3-7 simple spikes, upper ones simple spikes, becoming more or less patent, upper on rather longly lower on very longly exserted peduncles ; *peduncles* with angles usually distinct and scabrid, sometimes obscure and smooth, firm. *Rhachis* of the secondary panicles scabrid-hispidulous on the acute or narrowly winged angles. *Bracts* foliaceous, much exceeding the stem, upper much reduced, upper shortly to longly lower longly to very longly sheathing ; *sheaths* with a brown, glabrous mouth, nodes often dark. *Spikes* 10-22 mm long, subdenseflowered, male part much longer than the few-flowered female part and slenderly cylindric but tapering towards the apex. *Bracteoles* glumiform, midrib excurrent in a long, filiform, ciliolate-scaberulous, often curved awn. *Female glumes* triangular-lanceolate to triangular-ovate, flattish to cymbiform, apex acute to obtuse, 2-3 mm long, 1.25-2 mm wide, glabrous, dirty white tinged light brown, midrib and 2 adjacent nerves coalescing near the apex and excurrent in a stoutish, recurved, scaberulous awn, 0.25-3 mm long. *Utricles* ellipsoid to subglobose, more or less inflated and obscurely angled, 3.5-4.5 mm long, 1.5-2.3 mm broad, strongly multinerved, not or scarcely marginate, glabrous, apex often more or less bent, patulous to patent, not or scarcely stipitate, apex subabruptly beaked ; *beak* tapering, subterete or compressed, about 1.5 mm long, usually glabrous but sometimes narrowly marginate and sparsely hispidulous-margined, usually straight, sometimes twisted ; *mouth* dorsally very oblique, the apex being subacute and hyaline-lipped. *Achene* obovoid to subglobose, pyriform or ovoid-rhomboid, angles very pronounced, faces concave, especially below, 2-2.5 mm long, 1.5-2 mm broad, scarcely or shortly stipitate, beak very short. *Style*-base gradually thickened, conical or discoid-annulate, pale.

Thailand : C. Thailand ; Saraburi, Muak Lek, evergreen forest, 15 July 1925, *Nai-Noe* 96 (K) ! E. Thailand ; Koral, Katok, evergreen

Source : MNHN, Paris

forest, ± 300 m., 29 Dec. 1923, *Kerr* 8150 (BM, K) ! — S. E. Thailand ; Trat, Kaw Chang, Klawng Mayom, 10-100 m., common in clumps, evergreen forest, 2 April 1923, *Kerr* 6805 (BM, K) ! — Pen. Thailand ; Pak Chong, evergreen jungle, 300 m., 29 Dec. 1923, *Marcan* 1505 (K)! ; Peachuap, Ban Nawng Kang, ± 100 m., common in evergreen forest, 10 July 1926, *Kerr* 10,918 (BM. K)! ; Chumpawn, Bang Son, 10 March 1928, *Put* 1499 (K)! ; Tapli, *Kloss* 6817 (K)! ; Thailand, *Hosseus*. Surat, in scrub, under 10 m., 6 Jan. 1927, *Kerr* 11.301 (BM, K) !

Tongking : forests at Jon Bay, April, 1909, *Alleizette* sine num. (P.) !

Laos : S. Laos ; basin of the Se-Monn, valley in the forests of Cong Soai. Feb. 1876, *Harmand* 399 (P.) !

Annam : Tay Ninh Prov. ; Cay Cong, in dense woods, Jan. 1866. *Pierre* 1881 (BM, K)! ; ibid., April 1867, *Pierre* sine num. (BOG, K, P)! ; S. Annam ; Dalat and vicinity, in clay soil of thin forest, March-April 1932, *Squires* 753 (P)! ; Darlac Prov., port of Lae, underwood, 500-600 m., 17 April 1941, *Poilane* 32,414 (K, P)! Nha-trang, *Robinson*.

Cambodia : « Herb. Forest, Cambodge, *Magnien, Gourgand, Châtillon*, reçu le 20 Oct. 1909 » (P) ! Kamchay Mtns., *Hahn*. Towards Pnom-Penh, *Magnien*, etc.

Indo-China : Pungala, 6 Dec. 1918, *Md. Haniff* et *Md. Nur* 3862 (K) !

India ?, Malaysia.

Widespread in Indo-China but otherwise more restricted in its distribution than was earlier supposed.

### 27. *Carex dietrichiae* Boeck.

*Carex dietrichiae* Boeck. in Flora, 58 : 122 (1875) ; C. B. Clarke, 8 ; Nelmes, 273. — Queensland, *Dietrich* 644, 653.

*Carex indica* L. var. *laete-brunnea* C. B. Clarke in Hook. f., Fl. Brit. Ind. 6 : 715 (1894) ; C. B. Clarke, 8 ; Kükenth., 264 ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 187 (1912). — Ceylon, *Thwaites* 2628.

Loosely to densely tufted. *Rhizome* short. *Stems* erect, faces flattish, (15) 25-77 cm tall, 1-2.5 mm thick below, smooth except for the sparsely hispidulous angles on the rhachis above, surrounded, below the leaves, by more or less entire, pale, brownish- to blackish-nerved, leafless sheaths or their fuscous fibrous remains. *Leaves* basal and subbasal, 0-1 higher on the stem, some much exceeding the stems, 5-10 mm wide, flat or flattish, margins sometimes revolute, apices longly attenuated ; *sheaths* brown to fuscous or with blackish nerves on the back, membranous in front. *Inflorescence* a compound, interrupted, rather slender panicle, occupying the upper 16-35 cm of the stem ; *secondary panicles* 3-8, single, erect, more or less oblong or oblong-lanceolate in outline, 2-7 cm long, 1-2.5 cm broad, upper ap-

Source : MNHN, Paris

proximate to rather distantly lower distantly spaced, subdense. branches often simple spikes, occasionally lower again branched into several simple spikes, patulous to subpatent, upper on shortly or very shortly lower on shortly to longly exserted peduncles ; lower *peduncles* smooth, especially below, upper distinctly and scaberulous-angled, especially above, all rather slender but firm. *Rhachis* of the secondary panicles acutely and hispidulously angled. *Bracts* foliaceous but upper much reduced, usually all exceeding some rarely exceeded by, the stem, lower longly to very longly, upper longly to shortly, sheathing ; *sheaths* membranous, brown, glabrous to hispidulous, and concave at the mouth. *Spikes* cylindric, but male part the more slender and tapering at the apex, 5-15 mm long, subdense-flowered, patulous, becoming patent, male and female parts usually about equal in length, sometimes male part considerably the longer. *Bracteoles* gluniform, midrib excurrent in a long (up to 5 mm or more) filiform, hispidulous, often curved awn. *Female glumes* more or less oblong, oblong-ovate, or lanceolate, cymbiform, margins often involute, apex truncate to rotund, sometimes bilobed-emarginate, less commonly subacute to subobtuse, 2-3.5 mm long, 1-1.5 mm wide, usually glabrous but sometimes sparsely hispidulous towards the apex, castaneous above and on the margins below, or stramineous with castaneous patches, whitish stramineous below and usually in a narrow, central stripe above, margins widely whitish-hyaline above, distinctly nervose, midrib, coalescing with 2 adjacent nerves above, excurrent in a widish, hispidulous awn, 0.5-3.5 mm long. *Utricles* ellipsoid or broadly ellipsoid to obovoid-ellipsoid, rarely subglobose, subinflated and obscurely trigonous. faces often concave below, 3.5-5 mm long, 1.25-2 mm broad, multinerved, narrowly marginate, glabrous, sometimes slightly scurfy, margins sometimes sparsely hispidulous at the apex, usually straight or straightish, rarely slightly bent, patulous to subpatent, not or very shortly stipitate, subabruptly beaked ; *beak* subteretc or compressed, 1.5-2 mm long, narrowly marginate, glabrescent to sparsely hispidulous-margined, straight, rarely slightly twisted ; *mouth* castaneous, oblique, forming an acuminate, acute, whitish-hyaline, erose apex. *Achene* broadly ellipsoid or rhomboid-ellipsoid, angles pale, prominent, especially medianly, faces rather concave, especially below, 2.25-3 mm long, 1.25-1.8 mm broad, becoming very dark brown, abruptly extremely shortly stipitate, abruptly very shortly beaked ; *beak* cylindric, apex slightly expanding, discoid-annulate. *Style*-base slightly thickened pyramidally.

Lower Burma : Tenasserim, 1837, *Helfer*, Kew distrib. No. 6052 (K) ! ; 6087 (K) ! ; Mergui, *Griffith* 1011, Kew distrib. No. 6135 (K) ! ; Mergui, Little Tenasserim River, sea level, 26 Jan. 1928, *Sukoe* 7618 (K) !.

Thailand : *Schmidt.*

Tongking : Tranninh Prov., Ban Sot, pine-forest on clay, ± 1200 m, April 1932, *Petelot* 6138 (P) ! Long-tchéou, *Simond.*

Source : MNHN, Paris

Annam : Nha-trang and vicinity, 11-26 March 1911, *Robinson* 1939 (K, P) !

Cambodia : Kamchay, 26 Feb. 1896, *Hahn* (P) ! ; Kampot, open forest, common, 20 Jan. 1904, *Geoffray* 368 (P) !

Cochin China : 1862-66, *Thorel* 513 (K, P) ! ; forests, 16 April 1866, *Pierre* (BM, P) ! ; *Warburg*.

India, Malaysia, Solomon Islands, New Caledonia, Fiji, Queensland.

This species was misidentified by Boott (Illustr., 2 : 87, tt. 251, 254 ; 1860) as *C. indica* L. Others since and following Boott have also confused these two plants, so that the known area of *C. dietrichiae* has expanded while that of *C. indica* has shrunken.

### Sect. 7. **Cruciatae** (*C. B. Clarke*) Nelmes

in *Reinwardtia*, 1 : 275 (1951)

[Series] *Cruciatae* C. B. Clarke in *Journ. Linn. Soc. Bot.* 37 : 4 (1904).

*Secondary panicles* single or binate. *Spikes* numerous or very numerous. *Female glumes* pale with more or less reddish or castaneous lines or flecks. *Utricles* sometimes with spongy-thickened nerves. *Achenes* more or less ellipsoid or ellipsoid-obovoid, angles prominent, not centrally thickened, beak and or stipe straight or sometimes bent, apex not discoid-annulate. *Style*-base more or less thickened.

Female glumes glabrous ; utricles subinflated and obscurely trigonus, glabrous, nerves spongy-thickened .... 30. *C. cruciata.*

Female glumes (lower) hispidulous ; utricles not inflated but distinctly trigonous, hispidulous above, nerves not spongy-thickened :

Leaves 7-17 mm wide ; panicle 12-55 cm long ; utricles ellipsoid, 2-3.75 mm long, not or scarcely spongy-thickened at the base ..... 28. *C. condensata.*

Leaves 4.5-6 mm wide ; panicle 7-12 cm long ; utricles oblong-ellipsoid, 3.75-4 mm long, extremely spongy-thickened at the base ..... 29. *C. spongocrepis.*

### 28. **Carex condensata** Nees.

*Carex condensata* Nees in Wight, Contrib. Bot. Ind. 123 (1834) ; Boott, Illustr. 2 : 86, tt. 247-249 (1860) ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 190, fig. 27 (1-4) (1912). — India, *Royle* 83.

Loosely tufted. *Rhizome* shortly, often curved or obliquely creeping. *Stems* erect, 55-110 cm tall, 2-4 mm thick below, smooth up to the rhachis, which is sparsely to densely hispidulous, at least on its branches, surrounded, below the leaves, by a few reddish cataphylls

Source : MNHN, Paris

or their fibrous remains. *Leaves* mostly subbasal but 2-3 spaced higher on the stem, shorter than the stems, lower shorter bladed, 7-17 mm wide, flat or flattish, margins sometimes revolute, apices longly attenuated ; *sheaths* of the lower leaves often reddish. *Inflorescence* a compound often much interrupted panicle, occupying the upper 12-55 cm of the stem ; *secondary panicles* 2-7, at 2-5 nodes, sometimes all single but usually binate at middle nodes, more or less oblong-lanceolate to pyramidal in outline, erect or suberect, 3-9 cm long, 1.5-5 cm broad, upper subapproximate or more distant but usually subfastigiate, lower distant or very distant, more or less dense, lower and middle branches again branched once or twice into simple spikes, upper spikes simple, patulous to patent, lower panicles usually on longly or very longly, upper on scarcely to shortly, exserted peduncles ; *peduncles* sometimes smooth, at least below, otherwise more or less scabrous-hispid. *Bracts* of the lower panicles foliaceous and shorter to longer than the whole inflorescence, rather longly or longly sheathing, upper bracts subfoliaceous, shortly sheathing ; *sheaths* often yellowish at the nodes. *Spikes* 4-10 mm long, subdense-flowered, male part slightly to much longer than the female part. *Bracteoles* glumiform with a short to very long, ciliolate-hispidulous, often curved awn. *Female glumes* ovate, cymbiform, apex more or less obtuse, 1.75-3 mm long, 1.25-1.75 mm wide, lower often hispidulous, upper glabrous, pale with ferrugineous lines and flecks, nervose, midrib coalescing with two adjacent nerves above and extending to the apex, sometimes excurrent in a smooth or hispidulous mucro up to about 0.75 mm long. *Utricles* ellipsoid, 2-3.75 mm long, 1-1.5 mm broad, obscurely to distinctly few- or plurinerved, narrowly marginate, more or less densely hispidulous above, glabrous or glabrescent below or at the base, straight or slightly curved becoming patulous or subpatent, scarcely or very shortly stipitate, subabruptly beaked ; *beak* not or gradually tapering, planoconvex, 0.5-1 mm long, narrowly marginate, glabrescent to sparsely hispidulous, bidentate ; *mouth* scarcely oblique ; *teeth* rather lobe-like. *Achene* ellipsoid or oblong-ellipsoid, angles prominent, 1.75-2 mm long, 0.8-1.25 mm broad, becoming brownish, not stipitate, scarcely or very shortly and often bent-beaked. *Style*-base slightly thickened.

Thailand : N. Thailand ; Chiengmai, Doi Suitep, 1710 m., open grassy jungle, 7 Aug. 1910, *Kerr* 1306 (BM, K) ! ; Doi Intanon, Pah Agnem, north peak, 2205 m., 22 Oct. 1910, *Garrett* 81 (K)! ; Doi Intanon, Pah Agnem, e. 2100 m., clumps on open ridge, 17 July 1922, *Kerr* 6308 (BM, K, P) !

Tongking : Mt. Bavi, near the Black River, Don-son, Ouonbi, *Balansa* (P). Chapa ; July 1930, about 1500 m., *Petelot* 5492 (P)!

- India.

This species is treated by Kükenthal (in Engl. Pflanzenr. IV, 20 : 266 : 1909) as a synonym of *C. cruciata* Wahlenb.

Source : MNHN, Paris

### 29. *Carex spongocrepis* Nelmes.

Carex spongocrepis *Nelmes, sp. nov. ; affinis* C. condensatae *Nees, sed foliis angustioribus, paniculis brevioribus, utriculis oblongo-ellipsoideis majoribus basi spongioso-incrassatis differt.* — Thailand, *Put* 3352.

*Rhizome* unknown. *Stems* erect, angles obtuse, 35-55 cm tall, 2-3 mm thick below, smooth except on the rhachis which is scabrous-hispidulous on the angles. *Leaves* basal and subbasal and also occurring, though more longly spaced, throughout the stem, mostly exceeding or far exceeding the stem, 4.5-6 mm wide, flat or flattish, apices longly attenuated ; *sheaths* glabrous, brown and lower membranous at the concave mouth. *Inflorescence* an erect, terminal, continuous or slightly interrupted compound rather broad panicle, 7-12 cm long ; *secondary panicles* 2-3, single, oblong-pyramidal, 3-7 cm long, 2.5-5 cm broad, at approximate or subapproximate nodes and mostly fastigiate, rather dense, lower branches again once or twice branched into spikes, upper ones once branched or unbranched simple spikes, patulous to patent, upper on scarcely or shortly lower on shortly to longly exserted peduncles ; *peduncles* obtusely or obscurely angled, rather slender, smooth. *Bracts* foliaceous, lower moderately exceeding upper much reduced and not exceeding the inflorescence, lower rather longly upper rather shortly sheathing ; *sheaths* similar to the leaf-sheaths. *Spikes* 7-10 mm long, subdense-flowered, male part longer than the female part. *Bracteoles* glumiform, mostly straight to curved-aristate. *Female glumes* ovate-acuminate, cymbiform, apex acute to obtuse, 2.5-3 mm long, 1.5-2 mm wide, lower sparsely and minutely scurfy-setulose, upper quite glabrous, palish or very light brown with streaks and flushes of darker reddish-brown, distinctly nervose, midrib prominent, sometimes excurrent in a sparsely hispidulous mucro up to 0.5 mm long. *Utricles* narrowly oblong-ellipsoid, distinctly but obtusely angled, 3.75-4 mm long, 0.9-1 mm broad, nerveless on the centre of the dorsal face, otherwise obscurely pluri-nerved, narrowly marginate, usually sparsely scurfy-setulose above, and on the margins from above half-way upwards, infrequently glabrescent, straight or slightly recurved, becoming patulous, dull lightish brown with darker reddish-brown patches, extremely spongy-thickened below, not stipitate, gradually beaked ; *beak* plano-convex, gradually tapering, 1-1.5 mm long, narrowly marginate, glabrous above, sparsely setulose-margined below, bidentate ; *mouth* ventrally oblique ; *teeth* straight, lobe-like. *Achene* ellipsoid or obovoid-ellipsoid, prominently angled, 2-2.25 mm long (including stipe and beak), 0.9-1 mm broad, dark nut-brown, scarcely or very shortly pale-stipitate, shortly (0.2-0.4 mm) pale beaked, beak often somewhat bent, apex often slightly swollen. *Style*-base somewhat bulbously thickened.

Thailand : N. Thailand ; Chiengmai, Doi Nang Ka, 4 Nov. 1930, *Put* 3352 (K) !

Source : MNHN, Paris

### 30. **Carex cruciata** Wahlenb.

*Carex cruciata* Wahlenb. in *Vet. Akad. Handl. Stockholm*, 24 : 149 (1803) ; C. B. Clarke, 9 ; Kükenth., 185 ; E. G. Camus in Lecomte. Fl. Gén. Indo-Chine, 7 ; 189, fig. 27 (5-9) (1912) ; Nelmes, 277 — China, *Wannman* (ex Herb. Bergiano).

*Carex cruciata* Wahlenb. var. *argocarpus* C. B. Clarke in Hook. f., Fl. Brit. Ind. 6 : 716 (1894). — India, « abundant ».

Loosely tufted. *Rhizome* shortly and often curved or obliquely creeping. *Stems* erect, angles obtuse to subacute, prominent, faces flattish, 50-135 mm tall, 2-4.5 mm thick below, smooth, surrounded, below the leaves, by a few more or less entire, dark-reddish or vinaceous cataphylls and the brownish-fuscous remains of old leaf sheaths. *Leaves* mostly basal but also spaced above on the stem, usually some much exceeding the stem, lower shorter bladed, 6-14 mm wide, flattish-plicate, margins sometimes slightly revolute, sometimes slightly septate-nodulose in places, long-sheathing, apex longly attenuated ; *sheaths* of the lower leaves brown, dull reddish, or dull vinaceous to fuscous, mouth concave, dark brown. *Inflorescence* a compound panicle, continuous above, usually interrupted below, occupying the upper 14-58 cm of the stem ; *secondary panicles* 3-11, at 3-8 nodes, often all single but sometimes binate at middle nodes, upper difficult to distinguish from one another, more or less oblong-lanceolate to subpyramidal in outline, erect to patulous, 3.5-11 cm long, 2-5 cm broad, upper subapproximate to rather distantly spaced but usually fastigiate or subfastigiate, lower distant to very distant, lax to dense, lower branches again branched once or twice into simple spikes, patulous to patent, upper simple spikes, lower panicles on usually longly or very longly, upper on scarcely to shortly, exserted peduncles ; *peduncles* with angles usually acute and scabrid, sometimes obtuse and smooth. *Rhachis* of the main axis above, and of the secondary panicles, hispidulous on the angles, which are acute. *Bracts* foliaceous but upper reduced, slightly to much exceeding the stem, upper shortly or rather shortly lower longly or rather longly sheathing ; *sheaths* often somewhat golden at the nodes. *Spikes* 5-14 mm long, subdense-flowered, male part about as long as or longer than the female part. *Bracteoles* glumiform, midrih excurrent in a long, ciliolate-hispidulous, often curved awn. *Female glumes* ovate to widely ovate, or triangular-ovate, sometimes acuminate, deeply cymbiform, margins sometimes involute, apex acute to very obtuse, 1.75-3 mm long, 1.25-2 mm wide, glabrous, pale to light brown with castaneous or darker brown patches, lines, and flecks, margins paler and erose, nervose, midrih and 2 adjacent nerves coalescing above and extending to the apex in a firm tip or excurrent in a smooth or scabridulous awn up to 1 mm long. *Utricles* ovoid, ellipsoid-obovoid or almost subglobose, subinflated, 2.8-4 mm long, 1-1.5 mm broad, with spongy-thickened and few nerves on each face, scarcely to narrowly marginate, glabrous, straightish, patulous to patent, base usually very short, spongy, bul-

Source : MNHN, Paris

bous, stipe-like, apex subabruptly beaked ; *beak* compressed to terete, 1-1.5 mm long, narrowly marginate, glabrous or sparsely scarberulous-margined, usually straight, sometimes slightly twisted, bidentulate ; *mouth* dorsally oblique ; *teeth* often light reddish, whitish-hyaline tipped. *Achene* ellipsoid, angles prominent, faces flattish or shallowly concave, 1.5-2 mm long, 0.8-1.1 mm broad, olive-brown to blackish, angles sometimes paler, not or scarcely beaked, scarcely to very shortly, sometimes somewhat bent-stipitate. *Style*-base thickened.

Thailand : N. E. Thailand ; Loie, Phu Krading, in open pine forest, common, 1300 m., 14 June 1952, *Dee* 572 (R. Forest Dept. No. 7696) (K) !

Tongking : Mt. Bavi, *Balansa* 222 ; sides of the torrent of Ouonbi, 12 Sept. 1885, *Balansa* 223 (P) ! ; Mt. Bavi, grassy slopes, 15 Nov. 1888, *Balansa* 2816 (K, P) ! ; Cho-bo, Black River, in the forest, 16 Nov. 1887, *Balansa* 2817 (K, P) ! ; Dong Tom, near the rocks of Notre Dame, Black River, on the uncultivated slopes, 9 Jan, 1889, *Balansa* 2818 (P) ! ; Mt. Bavi, *Balansa* 2819 ; Long-Tchéou, « reçues le 14 fév. 1911 », *Simond* (P.) ! ; Chapa, « reçu le 11 Jan. 1912 », *Hantefeuille* 66,209 (P) ! ; Lao-Kay prov., road from Lao-Kay to Muong-xen, 700 m., 4 Dec. 1913, *Chevalier* 29,295 (P) ! ; Chapa, 1500-1800 m., July 1930, *Petelot* 5503 (P) ! ; Moncay prov., forest of the pointed Pagoda Tien Yen, near paths, 27 Aug. 1932, *Rothé* 35 (K, P) !

Annam : Muh Thuan prov., Langbian, *Eberhardt* 1860 (P) ! ; Haut Donai, Bi-Doup massif, on summit among pines, at more than 2000 m., 25 Aug. 1940, *Poilane* 30,247 (K, P) ! ; north of Dalat and of Haut Donai prov., in humid soil, 1500 m., 10 Sept. 1940, *Poilane* 30,342 (P) !

Cambodia : Pua Quae massif, Nam Kep, on decomposed schists, 900 m., July 1922, *Petelot* 600 (P) !

India, China, Japan, Malaysia.

I have not seen the *Geoffray* plant from Kampot, Cambodia, which is cited in Lecomte, Fl. Gén. Indo-Chine, 7 : 190 (1912) as *C. cruciata* Wahlenb. f. *glauca* Boeck. apud O. Kuntze. Lecomte also refers to « Cochinchine : Cai cong (*Pierre, Thorel*) » under *C. cruciata* Wahlenb. These collections are unknown to me. Finally, in the Fl. Gén. Indo-Chine, *C. cruciata* var. *argocarpus* C. B. Clarke is made to represent certain Indo-Chinese specimens. Until the Indian *Carices* are investigated I prefer to follow Kükenthal in regarding this « variety » as synonymous with the species.

Sect. 8. **Filicinae** (C. B. Clarke) Nelmes
in *Reinwardtia*, 1 : 286 (1951).

[Series] *Filicinae* C. B. Clarke in *Journ. Linn. Soc. Bot.* 37 : 4 (1904).

*Secondary panicles* often binate. *Spikes* numerous or very numerous. *Female glumes* reddish or castaneous. *Utricles* usually more or

Source : MNHN, Paris

less nerved, reddish or castaneous, or palish with reddish or castaneous flecks or patches, mouth usually dorsally oblique. *Achene* usually ellipsoid, angles prominent, not centrally thickened, *beak* and *stipe* often more or less bent, apex not discoid-annulate. *Style*-base scarcely or slightly thickened.

Leaves 2-8 (10) mm wide, utricles hispidulous above ..... 31. *C. continua.*

Leaves 7-20 mm wide ; utricles glabrous..... 32. *C. filicina.*

### 31. *Carex continua* C. B. Clarke.

*Carex continua* C. B. Clarke in Hook. f., Fl. Brit. Ind. 6 : 717 (1894) ; C. B. Clarke, 11 ; Kükenth., 281 ; Nelmes, 299. — India. *Wallich, C. B. Clarke.*

*Carex plebeia* C. B. Clarke in Hook. f., Fl. Brit. Ind. 6 : 718 (1894) ; Nelmes in Kew Bull. 1946 : 22, 24 (1946). — India, *C. B. Clarke* (4 gatherings).

*Carex continua* C. B. Clarke var. *plebeia* (C. B. Clarke) Kükenth. in Engl. Pflanzenr. IV, 20 : 282 (1909).

Loosely tufted. *Rhizome* very short. *Stems* erect, angles obtuse, faces flattish or shallowly concave, 35-70 cm tall, 1-2.75 mm thick below, smooth, including the lower part of the rhachis, surrounded, below the leaves, by palish to blackish-red sheaths or their fibrous remains. *Leaves* basal, and 1-2 higher on the stem, shorter to longer than the stem, 2-8 (10 mm) wide, flat or flattish, apices longly attenuated ; *sheaths* short, often blackish-red at the concave mouth and sometimes down the front. *Inflorescence* a compound, interrupted panicle, occupying the upper 13-20 cm of the stem ; *secondary panicles* 5-9, single, middle ones rarely binate, at 5-7 nodes, erect or suberect, oblong or pyramidal-oblong in outline, 1.5-7 cm long, 1-4.5 cm broad, upper subapproximate, on rather shortly to scarcely exserted peduncles, lower rather distant, on shortly to longly exserted peduncles, upper branches simple spikes, middle and lower ones again branched into 3-8 simple spikes, rather lax, branches and spikes becoming patent ; *peduncles* slender, smooth, or scabrid on the angles above. *Rhachis* of the secondary panicles sparsely hispidulous on the angles below, usually densely hispidulous above. *Bracts* foliaceous, equalling to much exceeding the apex of the stem, upper very shortly to shortly sheathing, lower rather longly to longly sheathing ; *sheaths* of the lower bracts glabrous, mouth, or sometimes the whole front blackish-red, sometimes pale, upper often minutely hispidulous, especially near the concave mouth. *Spikes* 4-9 mm long, subdense-flowered, male and female parts about equal in length. *Bracteoles* glumiform, awn straight to curved, 3-5 mm long. *Female glumes* ovate, cymbiform, apex obtuse to very obtuse, 1.25-3 mm long, 1-1.75 mm wide, usually glabrous but sometimes minutely hispidulous



Source : MNHN, Paris

above, light castaneous with darker streaks, margins narrowly to widely whitish-hyaline, becoming erose towards the apex, slenderly nervose, midrib sometimes excurrent in a smooth to minutely hispidulous-margined awn up to 0.75 mm long. *Utricles* ellipsoid, ellipsoid-obovoid, or oblong-obovoid, distinctly trigonous, faces flattish, 3-4.25 mm long, 0.8-1 mm broad, ventrally 4-6-nerved, dorsally 6-10-nerved, narrowly marginate, glabrous below, and over the centre of the dorsal face, otherwise sparsely hispidulous, or hispidulous only along several nerves above, somewhat reflexed or recurved, less often straight, becoming patulous to subpatent, grey-green or stramineous below, reddish spots or reddish-brown above, base spongy-thickened, scarcely or bulbously stipitate, subgradually beaked ; *beak* tapering, trigonous or compressed, 1-1.25 mm long, narrowly marginate, hispidulous-margined, bidentate ; *mouth* slightly oblique ; *teeth* straight or slightly converging, apices often whitish-hyaline. *Achene* ellipsoid, angles prominent, faces flattish to concave, 1.75-2.5 mm long, 0.8-1 mm broad, straight or slightly curved, becoming dark brown, angles sometimes rather pale, shortly stipitate and beaked ; *beak* bent or straight. *Style* rather slender, base slightly thickened.

Thailand : N. Thailand ; Chiengmai, Doi Sutep, 330-540 m, in deciduous jungle, 21 July 1910, *Kerr* 1268 (BM, K, P) ! ; ibid., 450 m, in deciduous jungle, 26 Aug. 1911, *Kerr* 1977 (BM, K) ! — S.W. Thailand ; Kanburi, near Neeckey, and Wangka, in bamboo grove, 4 May 1946, *Wichian* (Kwae Noi River Basin Exp. 1946, No. 326) (K) ! ; Kanburi, Hindat, about 160 km north-west of Kanburi, dry mixed forest, gravel-like soil or rocks, 100-150 m, 24-25 July 1946, *Kostermans* (Kwae Noi River Basin Exp. 1946, No. 1338) (BOG) !

Laos : *Massie* (« Entrées le 30 avril 1895 ») (P) !

Cochin China/Laos : *Counillon* (« Reçu en Juillet 1897 ») (P) !

India, Upper Burma, China, Philippine Islands, Moluccas.

I have decided to sink the Thailand plant hitherto determined as *C. plebeia* C. B. Clarke under *C. continua* C. B. Clarke. It differs from *C. continua* in smaller and more dense secondary panicles and in slightly larger glumes and utricles. The (true) Indian *C. plebeia* C. B. Clarke is still nearer to *C. continua* and cannot, as I now think, be specifically separated from it.

### 32. *Carex filicina* Nees.

*Carex filicina* Nees in Wight, Contrib. Bot. Ind. 123 (1834) ; Boott, Illustr. 3 : 105, tt. 311-312 (1862) ; C. B. Clarke, 11 ; Kükenth., 274 ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 191 (1912) ; Nelmes, 304. — India, *Wight*.

Loosely tufted. *Rhizome* short, not creeping. *Stems* erect, angles obtuse to acute, 70-160 cm tall, 2.5-6 mm thick near the base, smooth, including the rhachis below. *Leaves* basal, and several evenly spaced on the stem above, not exceeding the stem, 7-12 mm wide, flat or

Source : MNHN, Paris

flattish, sometimes slenderly septate-nodulose in places, longly sheathing, few lower reduced to vinaceous, reddish, or blackish-red cataphylls ; *sheaths* brownish-membranous at the mouth, glabrous, lower often vinaceous, reddish, or reddish-nerved, front fraying into fibres, upper often pale yellowish towards and at the nodes. *Inflorescence* a compound, continuous or interrupted panicle, occupying the upper 15-60 cm of the stem ; *secondary panicles* 5-13, single and (middle ones) binate, at 4-8 nodes, lanceolate, oblong-lanceolate, or pyramidal in outline, 4-12 cm long, 2-5.5 cm broad, dense or sublax, few or many lower branches again (or twice) branched into 2-7 simple spikes, upper unbranched (simple) spikes, branches and spikes patulous to patent, upper at subapproximate or distant nodes, lower distant or remote, upper subsessile or on shortly, lower on shortly to very longly, unequally exserted peduncles ; *peduncles* slender, lower smooth below, otherwise hispidulous, especially on the angles. *Rhachis* smooth below, hispidulous above and on the rhachis of the secondary panicles. *Bracts* foliaceous, lower mostly shorter but some equalling or slightly exceeding the inflorescence, all longer than their own panicles, longly to very longly sheathing, upper much reduced ; *sheaths* as those of upper leaves. *Spikes* 4-15 mm long, subdense to lax-flowered, male part equalling to much shorter than the female part. *Bracteoles* glumiform, midrib excurrent in a short and straight, or long and curved or flexuous, hispidulous awn. *Female glumes* ovate to lanceolate, shallowly cymbiform, apex usually obtuse but sometimes acute, 1.5-2 mm long, 0.6-1.4 mm wide, light reddish, sometimes flecked darker red, to ferrugineous, margins not whitish-hyaline, glabrous to hispidulous, very slenderly multinerved, midrib slender, sometimes glabrous to hispidulous, pale, not or extending to the apex, not excurrent. *Utricles* ellipsoid, 3-5 mm long, 0.6-1 mm broad, conspicuously multinerved, glabrous, patulous to patent, not or scarcely marginate, straightish to recurved, pale green to stramineous, often with reddish patches, somewhat spongy-thickened at the base, scarcely to very shortly stipitate, subabruptly beaked ; *beak* subterete, 1.5-2 mm long, scarcely marginate, scarcely to slightly tapering, glabrous, rarely very sparsely hispidulous-margined, reddish ; *mouth* very oblique. *Achene* ellipsoid, 1.5-1.75 mm long, 0.7-0.8 mm broad, scarcely or shortly and sometimes bent-beaked and -stipitate ; *beak* slightly thickened at the apex. *Style*-base slightly thickened.

Tongking : north of the station of Cho-bo, *Balansa* ; Chapa ; c. 1500 m, Nov. 1924, *Petelot* 1744 (P) ! ; ibid., c. 1900 m, Aug. 1930, *Petelot* 5479 (P) ! ; ibid., clayey slope in forest, c. 1500 m, Aug. 1931, *Petelot* 5502 (P) !

Laos : Pakson Plateau, Boloven, margin of a pond, 1200 m., 26 Nov. 1938, *Poilane* 28,616 (P) ! ; [without precise locality] *Massie*.

Annam : Massif of Lang-Bian, Ankroët waterfall, near Dankia, margins of cascades, 1400 m, 14 Feb. 1914, *Chevalier* 30,757 (P) !

India, China, Japan.

Source : MNHN, Paris

E. G. Camus, in Lecomte, Fl. Gén. Indo-Chine, 7 : 192 (1912), has identified a *Kerr* gathering from « Xieng-mai », Thailand, as *C. filicina* var. *meiogyna* Strachey. I have not seen this plant, unless it is a misidentification of *C. plebeia* C. B. Clarke. In any case, Strachey's variety is in my opinion of doubtful independent status.

The following species is very immature but seems to belong to Sect. *Filicinae*.

*Carex sp.* — THAILAND : Chiengmai, Doi Pha Khao, south slope near summit, 1780 m, 8 Aug. 1931, *Garrett* 682 (K) !

TONGKING : Massif of Tam Dao, ± 900 m, Jan. 1922, *Petelot* 327 (P) !

### SECT. 9. **Polystachyae** Tuckerm., Enum. Meth. 10 (1843).

*Stems* very tall, stout, smooth. *Leaves* with reddish or vinaceous sheaths which split into herring-bone shaped fibres in front. *Secondary panicles* single. *Spikes* numerous to very numerous, 1-8 cm long, cylindric. *Female glumes* castaneous, with wide whitish-hyaline margins. *Utricles* subabruptly or abruptly beaked.

Utricles inflated, glabrous except the margins at the apex.... . ..... 33. *C. baccans*

Utricles not inflated, hispidulous ..... 34. *C. myosurus.*

### 33. *Carex baccans* Nees.

*Carex baccans* Nees in Wight, Contrib. Bot. Ind. 122 (1834) ; Boott, Illustr. 2 : 83, t. 234-236, 238, 239 (1860) ; C. B. Clarke, 14 ; Kükenth., 258, fig. 39, E-H ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 185, fig. 26 (5-10) (1912) ; Nelmes, 322. — India, *Wight* 1912.

Loosely tufted. *Rhizome* short. *Stems* erect, angles prominent, often subacute, 60-150 cm tall, 4-5 mm or more thick below, smooth, clothed at the base by vinaceous to fuscous leaf-sheaths, splitting at the front into herring-bone shaped fibres. *Leaves* subbasal and at intervals throughout the stem, some, at least, exceeding the stem, 4-14 mm wide, usually with more or less revolute margins, sometimes flattish, upper surface scabrous-papillose above, apices longly attenuated. *Inflorescence* a compound, interrupted panicle, occupying the upper third to more than half of the stem ; *secondary panicles* about 5-7, upper not often easily distinguishable from one another, erect or suberect, ellipsoid or oblong-ellipsoid, 5-30 cm long, 3-5 cm thick, upper approximate, forming a more or less dense head, lower distant or remote from one another, becoming dense, lower and middle branches simple or spikes again branched into 2-10 mostly simple spikes, upper spikes unbranched, peduncles of upper panicles usually wholly included in sheaths, lower shortly to very longly exserted ; *peduncles* smooth or obscurely and slightly scaberulously angled.

Source : MNHN, Paris

*Rhachis* of the seeondary panicles obscurely and smoothly to acutely and scaberulously angled. *Bracts* (lower) foliaceous, usually exceeding the stem, longly to very longly sheathing, upper much reduced, subsetaceous, extending up to or slightly exceeding the apex of the stem, sheathing ; *sheaths* glabrous, upper brown near the whitish-hyaline mouth. *Spikes* 2-6 cm long, subdense-flowered, suberect to subpatent, female part longer to shorter than the male part. *Bracteoles* glumiform, sometimes shortly aristate. *Cladoprophylls* utriculiform. *Female glumes* ovate, oblong-ovate or oblong, cymbiform, apex subacute to obtuse, 2.5-3.5 mm long, 1.8-2.25 mm wide, glabrous or less frequently hispidulous, nervose, midrib from failing to extend to the apex to excurrent in a scaberulous muero. *Utricles* ellipsoid, obovoid, or subglobose, inflated and obscurely trigonous, 3.5-4.25 mm long, 1.75-2.5 mm broad, strongly nervose, narrowly marginate, glabrous except for the minutely hispidulous margins at the apex, apex usually becoming curved, patulous to patent, dull yellowish-green below at first but sometimes becoming reddish, reddish to blackish-red above, scarcely to very shortly stipitate ; *beak* subterete or compressed, usually minutely scaberulous - margined, bidentate ; *teeth* straight or slightly diverging. *Achene* ellipsoid, angles prominent, faces flattish or shallowly concave, 2.75-3 mm long, 1-1.25 mm broad, becoming dark brown to fuscous, usually shortly and bent-stipitate and beaked. *Style* slender, short, base not thiekened.

Thailand : N. Thailand ; Chiengmai, Doi Chiengdao, ± 1400 m, in clumps on open grassy slopes, 6 Nov. 1922, *Kerr* 6620 (BM, K) ! ; Doi Chiengdao, 14 Oct. 1926, *Put* 325 (BM, K) ! ; Doi Sutep, 14 Dec. 1904, *Hosseus* 255 (BM) !. — E. Thailand ; Korat, Kao Lem, 1200-1300 m, open spaces in evergreen forest, 12 Jan. 1925, *Kerr* 9943 (BM, K) ! — Pen. Thailand ; Ranawng, Kao Pawta Chongdong, ± 900 m, evergreen forest, 21 Jan. 1929, *Kerr* 16792 (K) !

Tongking : sides of footpaths on Mt. Bavi, 18 Oct. 1887, *Balansa* 2813 (K, P) ! ; Cbapa, « reçu en Jan. 1912 », *Lecomte et Finet* 501 (P) ! ; *Hantefeuille* ; Lao-Kay prov., Muong-Xen, 700 m, 4 Dec. 1913, *Chevalier* 29,301 (P) ! ; by paths in forest, Tam Dao massif, ± 900 m, Nov. 1930, *Petelot* 6114 (P) !

Laos : Saravane prov., summit of Pou Set, rock-fissures in forest, 1250 m, 23 Oct. 1928, *Poilane* 16,118 (K, P) !

Annam : Tourane, Jan. 1837, *Gaudichaud* 66 (P) ! ; Quang-nam prov., *Eberhardt* 2442 (P) ! ; *O. Kuntze.*

India, Upper Burma, Formosa, China, Japan.

### 34. *Carex myosurus* Nees.

*Carex myosurus* Nees in Wight, Contrib. Bot. Ind. 122 (1834) (excl. pl. Nepal.) ; Boott, Illustr. 2 : 82, tt. 229, 230, 232 (1860) ; Kükenth., 258 ; Nelmes, 325. — India, *Wight* 1913.

Source : MNHN, Paris

Loosely tufted. *Rhizome* elongated but scarcely creeping *Stems* 60-200 cm tall, erect, 2-4 mm thick below, angles obtuse but prominent, mainly smooth, clothed at the base by a few entire, reddish-brown to blackish leaf-sheaths or their fuscous, fibrous remains. *Leaves* basal and subbasal, and a few widely spaced on the stem above, some at least equalling or even exceeding the stems, 5-10 mm wide, flattish or sometimes revolute. *Inflorescence* cernuous or subcernuous, narrow and interrupted, occupying the upper 25-100 cm of the stem ; *secondary panicles* 5-9, suberect to cernuous, more or less oblong or oblong-lanceolate in outline, 6-25 cm long, 2-3 cm thick, upper approximate and fastigiate, lower distant to very distant from one another, upper sessile or on shortly exserted peduncles, lower on rather to very longly exserted peduncles, branches often again branched into 2-8 simple spikes, but sometimes all except the lower and uppermost branches in the form of simple spikes, suberect to patulous ; *peduncles* mainly scabrid or scaberulous. *Rhachis* of the main and secondary panicles minutely scaberulous, at least above. *Bracts* of the lower panicles foliaceous, mostly exceeding the apex of the stem, upper bracts very much reduced, subfoliaceous or glumiform ; *sheaths* also varying in length, the lowest being very long and the uppermost very short, glabrous or sparsely hispidulous, nodes sometimes reddish-brown. *Spikes* 1-8 cm long, the main spikes longer or much longer than the lateral spikes, male and female parts often about equal in length but sometimes terminal or main spikes almost wholly male, sometimes some of the lateral spikes almost wholly female, subdense-flowered. *Bracteoles* glumiform. *Cladoprophylls* in process of elimination or transformation, hidden by the bracteole and squeezed between it and the spike-axis, utriculi-ocreiform. *Female glumes* oblong-obovate, oblong-ovate, or oblong with a rounded or subtriangular apex, flattish to deeply cymbiform, apex acute to very obtuse, 2.5-4 mm long, 1-1.5 mm wide, glabrous, slenderly nervose, midrib usually excurrent in an awn up to 1.5 mm long, smooth or minutely hispidulous. *Utricles* ellipsoid, sometimes slightly obovoid-ellipsoid, trigonous or subtrigonous, sometimes asymetrically, 3.25-4.75 mm long, 1-1.6 mm broad, narrowly marginate, distinctly nervose, castaneous and subadpressed hispidulous above, straight or straightish, subpatulous to patulous, the base cuneate and spongy stipitate ; *beak* plano-convex or compressed, gradually tapering, 0.75-1 mm long, narrowly marginate, hispidulous-margined, bidentate ; *mouth* not oblique ; *teeth* smooth or minutely hispidulous, straight or slightly diverging. *Achene* ellipsoid or oblong-ellipsoid, and sometimes slightly obovoid, angles prominent, faces flat to concave, 2-3 mm long, 0.7-1 mm broad, straight or straightish, becoming dark brown, scarcely to shortly, straight to slightly bent-stipitate, abruptly beaked ; *beak* short, straight to bent or curved. *Style* short, base not thickened.

Lower Burma : Pegu, *Griffith* ; Mergui, *Griffith* 118 (K) !

India, Malaysia.

Source : MNHN, Paris

## Subgenus 2. **CAREX**.

### Key to the Sections.

Spike 1 ..... 10. *Rhizopodae.*
Spikes few to numerous :
  Stigmas 2 ; utricles plano-convex or biconvex :
    Bracts sheathing, lower usually longly sheathing ; spikes 1-5 or more at each node ; utricles usually hispidulous. 13. *Graciles.*
    Bracts without sheaths ; spikes single at each node, rarely binate ; utricles glabrous ..... 22. *Praelongae.*
  Stigmas 3 ; utricles more or less trigonous :
    Spikes androgynaeceous :
      Stems arising from axils of leaves on a short undeveloped shoot ; utricles and achenes concave-faceted ..... ..... 14. *Cryptostachyae.*
      Stems arising from the centre of the foliage leaves and developed from the shoot on which these are borne ; utricles and achenes not concave-faceted :
        Spikes 5 - numerous from each node ..... 11. *Decorae.*
        Spikes single or sometimes binate at each node :
          Spikes 2-6, upper and lower single, usually binate at middle nodes ; female glumes castaneous or ferrugineous.... ..... 12. *Borneënses.*
          Spikes 1-3 (4), single ; female glumes whitish-stramineous. ..... 17. *Radicales.*
    Terminat spike male, rarely gynaecandrous :
      Spikes several to rather numerous from each node..... ..... 11. *Decorae.*
      Spikes single at every node :
        Utricles tageniform or rhomboid-lageniform ; achenes girdled by a central transverse ridge ..... 15. *Lageniformes.*
        Utricles not lageniform ; achenes not ridged :
          Achenes with a mitrate or discoid-annulate apex..... ..... 16. *Mitratae.*
          Achenes not mitrate nor discoid-annulate, except in *C. anomocarya* (Sect. 18) :
            Stems often lateral ; utricles very large (5.25-10.25 mm long) ; achenes often medianly sunk into a cavity on the angles ..... 18. *Rhomboidales.*
            Stems central ; utricles smaller (3-6 mm long) ; angles of achenes not sunk into a cavity :
              Normal leaves numerous but all on the upper part of the stem, lower reduced to sheaths. 21. *Scleriiculmes.*
              Normal leaves on the lower third except for 0-2 on the upper part of the stem :
                Male spikes 2-5 (7) ; utricles densely hispidulous ..... 20. *Hirtae.*
                Male spike 1 ; utricles glabrous.... 19. *Tumidae.*

Source : MNHN, Paris

Sect. 10. **Rhizopodae** Ohwi

in *Mem. Coll. Sci. Kyoto Imp. Univ.*, ser. B, 11 : 443 (1936).

*Stems* subflaccid, angles acute to narrowly winged and scaberulous. *Spikes* solitary, androgynaeceous, more or less cylindric. *Utricles* distinctly trigonous, slenderly nervose, glabrous, pale greenish. becoming patulous, apex of beak subentire or minutely toothed, mouth very small, not oblique. *Achene* about half as long as the utricle. *Stigmas* 3.

Only Indo-Chinese species ..... 35. *C. petelotii*

35. **Carex petelotii** Gross.

*Carex petelotii* Gross in *Notizbl. Bot. Gart. Berl.* 14 : 191 (1938) ; Nelmes in *Kew Bull.* 1946 : 6, 25 (1946). — Tongking, *Petelot* 6125.

Densely tufted. *Rhizome* very short. *Stems* erect, 25-65 cm tall, 0.75-1 mm thick below, base clothed by reddish, entire or subentire cataphylls or leafless-sheaths. *Leaves* subbasal, clothing about the lower third of the stem, lower short-bladed, upper up to nearly as long as the stem, 2-4 mm wide, flat or flattish, apices longly attenuated ; *sheaths* pale to reddish, membranous in front. *Spike* terminal, 1.5-3 cm long, male part 1-1.5 mm thick, female part becoming twice as thick as the male on maturity, each part about equal in length, sometimes the male part shorter, sublax-flowered. *Bract* setaceous with a glumiform base, up to half as long as the spike, or glumiform with a long awn, functioning as a glume, i. e. with a utricle in its axil. *Female glumes* ovate or oblong-ovate, cymbiform to rigidly incurved or subconduplicate, apex very obtuse to rounded, invariably about 3 mm long, about 2 mm wide, pale or sometimes slightly reddish-fulvous above, nerveless or very slenderly nervose, midrib and 2 obscure adjacent nerves coalescing and excurrent in a smooth or minutely scaberulous awn, 1-2 mm long. *Utricles* narrowly ellipsoid or oblong-ellipsoid, 5 (-6) mm long, 1.5 mm broad, narrowly marginate, straightish, shortly (about 0.4 mm) stipitate, subabruptly beaked ; *beak* planoconvex, scarcely tapering, 0.6-0.8 mm long, pale. *Achene* ellipsoid, angles prominent, face concave, 2.5 mm long, 1.3 mm broad, shortly stipitate and beaked. *Style*-base scarcely thickened.

Tongking : Chapa, forest paths, about 1500 m., 25 April 1935, *Petelot* 6125 (BOG) !

Sect. 11. **Decorae** (Kukenth.) Ohwi

in *Mem. Coll. Sci. Kyoto Imp. Univ.* ser. B, 11 : 338 (1936).

*Spikes* usually in fascictes, simple or bearing smaller branch-spikes, all androgynaeceous or at least one in each fascicle often male or female, lax-to subdense-flowered. *Bracts* sheathing. *Female glumes* usually more or less dark reddish, sometimes fulvous, cataneous or vinaceous, usually strongly incurved at the base. *Utricles* suberect

Source : MNHN, Paris

to patulous, ellipsoid or oblong-ellipsoid but tapering at each end, often dark reddish or with dark reddish patches ; *beak* long or very long, apex usually bidentulate. *Stigmas* 3.

Upper spikes male, lower androgynaeceous or female (leaves 2.5-6 mm wide) ..... 37. *C. phacelostachys.*
All spikes androgynaeceous :
Leaves about 4 mm wide ; awns of female glumes 1.5-4.5 mm long. ..... 40. *C. phyllocaula.*
Leaves 5-16 mm wide ; awns of female glumes 0-1 mm long :
Spikes 2-6 cm long ; female glumes oblong-lanceolate ; utricles 7.5-9 mm long ..... 38. *C. vansteenisii.*
Spikes 1-4 cm long ; female glumes ovate to ovate-oblong ; utricles 3.5-6 mm long :
Secondary panicles 6-20 ; spikes 1-4 cm long ; female glumes 2.75-4 mm long ..... 39. *C. tonkinensis.*
Secondary panicles 6-7 ; spikes 1-1.8 cm long ; female glumes 5-6 mm long ..... 36. *C. arridens.*

In my Malaysian *Carex* Revision I left C. *vansteenisii* unattached to any section and I placed *C. tonkinensis* rather hesitantly in Sect. *Stramentitiae*. They are now brought together here with *C. phyllocaula*, known only from an incomplete specimen, but this section may well need modification when we understand these species better and when missing links are discovered.

### 36. *Carex arridens* C. B. Clarke.

*Carex arridens* C.B. Clarke in Hook. f., Fl. Brit. Ind. 6 : 726 (1894) ; C.B. Clarke, 13 ; Kükenth., 546 ; Nelmes, 333. — Lower Burma, *Kurz;* Malay Peninsula, *Kunstler.*

*Stem* erect, 55 cm long, about 2 mm thick below, almost entirely hidden, below the rhachis, by leaf-sheaths, smooth but sparsely scaberulous at the apex of the rhachis, clothed below the leaves at the base by a few strongly nerved spadiceous cataphylls. *Leaves* about 10, on the lower 10 cm of the stem, 40-70 cm long, 9-12 mm wide, but lower few shorter and narrower, flat or flattish, upper surface scabrid towards the apex, often inconspicuously septate-nodulose in places, apex shortly to rather longly attenuated ; *sheaths* spadiceous, strongly blackish-nerved, hispidulous on the dark reddish-brown or spadiceous, membranous front. *Inflorescence* not fully developed, a much interrupted, slender panicle, 30 cm long ; *secondary inflorescences* 6-7, single except at a middle node where binate, narrowly oblong or oblong-lanceolate in outline, 2.5-5 cm long, 5-7 (-10) mm broad, 2-3 upper approximate and fastigiate, remainder distant from one another, each branched into 5-7 simple, sessile spikes, upper on scarcely or shortly exserted, lower on longly exserted, peduncles. *Rhachis* of the secondary inflorescences smooth below, angles sometimes sparsely hispidulous above. *Bracts* foliaceous, lower much

Source : MNHN, Paris

exceeding the stem, upper smaller, exceeding or exceeded by the stem ; *sheaths* membranous, hispidulous and castaneous at the deeply concave to subtruncate mouth. *Spikes* erect to suberect, fastigiate or subfastigiate, androgynaeceous, narrowly ellipsoid or cylindric-lanceolate, 1-1.8 cm long, 1.5-2 mm thick (in flower), male part very much longer than the female part. *Bracteoles* large and often longly awned glumes, clasping the rhachis and base of spike. *Cladoprophylls* oblong with rounded upper corners, subutriculiform, about 4 mm long. *Female glumes* ovate, deeply cymbiform, apex very obtuse, sometimes bilobed-emarginate, 5-6 mm long, about 3 mm wide, nervose, some nerves vinaceous, midrib reddish, coalescing with 2 adjacent vinaceous nerves above, and excurrent from just below the wide whitish apical margin in a minutely hispidulous awn, up to 0.5 mm long. *Utricles* very undeveloped, up to 6 mm long and 1.5 mm broad, strongly plurinerved, narrowly marginate, hispidulous, especially on the margins, gradually tapering above into a *beak* which is very long, hispidulous ; *teeth* long, white, hispidulous.

Lower Burma : Pegu ; Nattoung, 1200 m., *Kurz*.

Malay Peninsula.

The following immature plants are placed here with some doubt : Annam : Kountum prov. ; Nui Dai Ding, near Dak Gley, among underwood, in poor granitic soil in ancient forest, 1300-1400 m., 21 Jan. 1947, *Poilane* 32,828, 32,843 (P) !

### 37. *Carex phacelostachys* Nelmes.

*Carex phacelostachys* Nelmes in *Kew Bull.* 1950 : 195 (1950) ; Nelmes, 344. — Malay Peninsula, *H. C. Robinson*.

Tufted. *Rhizome* oblique, shortly creeping, slender, clothed with short, strongly nerved, brown scales. *Stems* erect or suberect, apex apparently somewhat cernuous, 30-50 cm tall, about 1.5 mm thick below, smooth except at the sparsely scaberulous apex, often largely hidden by leaf-sheaths below the rhachis, surrounded at the base, below the leaves, by a few reddish cataphylls. *Leaves* mostly basal and subbasal, but 1-several higher on the stem, mostly considerably shorter than but a few about equalling the stem, 2.5-6 mm wide, mainly flat or flattish but upper margins sometimes revolute, upper surface covered with minute rough protuberances towards the longly attenuated apices ; *sheaths* of the basal leaves membranous and often reddish in front, concave and glabrous at the mouth. *Inflorescence* a slender, continuous, or little interrupted panicle, occupying the upper 24-27.5 cm of the stem, and consisting of 5-7 *fascicles*, each consisting of 1-3 unequally peduncled spikes, the shortly peduncled ones being simple but the longly peduncled ones often branched into 2-6 simple spikes, upper fascicles approximate or subapproximate and fastigiate or subfastigiate, lower rather distant but often subfastigiate. *Bracts* of the lower fascicles foliaceous, much shorter than to slightly

Source : MNHN, Paris

exceeding the stem, upper bracts much reduced, subfoliaceous, filiform, usually failing to reach but sometimes slightly exceeding the stem ; *sheaths* partly to wholly reddish and membranous. *Spikes* straight and erect or suberect except the uppermost and some of the long ones which are sometimes subcernuous, those of the lower and middle fascicles, if simple, wholly female, middle ones, if branched or longly peduncled, androgynaeceous, upper spikes wholly male or with a few female flowers at their bases, cylindric, 1-8 cm long, male spikes and parts of spikes 1-2 mm thick, female ones 4-5 mm thick. *Bracteoles* large tubular sheaths, clasping the bases of the spikes and completely enclosing the cladoprophylls. *Cladoprophylls* 2-4.5 mm long, more or less ocreiform, though subutriculiform below, apex sometimes bilobed with 2 midribs. *Female glumes* oblong-ovate or oblong-lanceolate, cymbiform above, apex usually obtuse or very obtuse but sometimes subacute, 4-6 mm long, about 2 mm wide, slenderly nervose, midrib often palish, hispidulous towards the apex, excurrent in an hispidulous awn, 0.25-1.5 mm long. *Utricles* 5.5-5.75 mm long, about 1 mm broad, 3-6 nerved on the angled dorsal and 2-5-nerved on the ventral face, very narrowly marginate, glabrous, straight or slightly and sometimes obliquely recurved, tapering below into a long, spongy, stipe-like base, gradually to subgradually narrowing into a beak above ; *beak* gradually tapering, concave-convex, narrowly marginate, glabrescent to sparsely hispidulous-margined ; *mouth* ventrally somewhat oblique ; *teeth* straight, whitish-hyaline, becoming erose. *Achene* oblong-ellipsoid, sometimes oblong-obovoid, conspicuously angled, faces flattish, 1.75-2 mm long, 0.9 mm broad, tapering below, not or scarcely stipitate, apex subrotund, erostrate. *Style*-base thickened.

Laos : Mt. Pu Bia, open space in evergreen forest, ± 2700 m., 14 April 1932, *Kerr* 21,041 (K) !

Malay Peninsula.

### 38. *Carex vansteenisii* Kükenth.

*Carex vansteenisii* Kükenth. in *Bull. Jard. Bot. Buitenz.*, sér. 3, 16 : 320 (1940). — Sumatra, *van Steenis* 8461.

*Rhizome* short, stout. *Stems* erect, angles acute below, about 150-160 cm tall, 3-4 mm thick below, smooth throughout, including the rhachis, *Leaves* basal and subbasal, and 1-2 widely spaced above, hiding much of the stem, and except a few short basal ones, long and very long but shorter than the stem, 10-15 mm wide, flat or flattish, sometimes indistinctly septate-nodulose ; *sheaths* short, spadiceous or fuscous-nerved on the back, narrowly brown-membranous in front. *Inflorescence* subnutant above, much interrupted, lax, compound-paniculate, occupying the upper third or more of the stem, and composed of 5-7 fascicles, each consisting of 2-3 unequally peduncled spikes, the shorter one simple, but the longer 1-2 bearing 1-6 short branching spikes, upper panicles subapproximate, or distant, lower

Source : MNHN, Paris

distant or remote from one another. *Bracts* of the lower panicles foliaceous, much shorter than the inflorescence, upper bracts much reduced, subfoliaceous to setaceous ; *sheaths* brown-membranous at the mouth. *Spikes* androgynaeceous, erect to subnutant, oblong-cylindric, 2-6 cm long, 5-8 mm thick, sublax-flowered, male part much shorter than the female ; *peduncles* short to very long, slender, smooth. *Bracteoles* (at the base of the branch-spikes) long, ghumiform, base amplexicaul. *Female glumes* oblong-lanceolate, apex acute or sometimes obtuse and erose-ciliolate, 4.5-5.5 mm long, 2-2.75 mm wide, glabrous or nearly so below, sparsely to subdensely subadpressed-hispidulous above, nervose, midrib prominent, sometimes hispid towards the apex, which is often excurrent in a flattish glabrous awn up to 1 mm long. *Utricles* (not fully developed) oblong-fusiform or ellipsoid-lanceolate, 7.5-9 mm long, 1-1.5 mm broad, narrowly marginate, hispidulous, sometimes glabrescent below, margins hispid, usually somewhat recurved, suberect to patulous, becoming light reddish-brown, 0.5-0.75 mm stipitate ; *beak* tapering, compressed-trigonous, 2-3 mm long, narrowly marginate, hispidulous, straightish, bilobed ; *lobes* straight or converging. *Achene* (immature) ellipsoid-oblong or slightly oblong-obovoid, faces flattish to concave, 3.5-4 mm long, 1-1.3 mm broad, shortly stipitate, beak slightly to extremely bent, 0.3-0.4 mm long. *Style*-base slightly thickened.

Laos : Mt. Pu Bia, in evergreen forest, 2200 m., 13 April 1932, *Kerr* 21,015 (K) !

### 39. *Carex tonkinensis* Franch.

*Carex tonkinensis* Franch. in *Nouv. Arch. Mus. Hist. Nat.*, Paris, sér. 3, 8 : 251 (1896) ; Kükenth., 292 ; Nelmes, 254. — Tongking, *Balansa* 2814.

Tufted. *Rhizome* stout, clothed with brown to fuscous sheathing scales. *Stems* erect, angles acute above, 50-175 cm tall, 2.75-4 mm thick below, smooth, including most of the rhachis. *Leaves* spaced throughout and shorter than the stem, 5-16 mm wide, flat or flattish, sometimes slightly septate-nodulose, both surfaces sometimes bristly above, sometimes transversely undulate towards the attenuated apices ; *sheaths* glabrous or glabrescent below, selulose above, brown in front. *Inflorescence* a rather slender, compound, interrupted panicle, occupying the uper 30-103 cm of the stem ; *secondary panicles* 6-20, at 5-7 nodes, lower single, upper unequally binate or ternate, 5-9.5 cm long, upper approximate and subfastigiate, lower distant or remote, upper spikes unbranched, lower again branched into 1-several simple spikes, lower on longly or very longly, upper on scarcely to longly, exserted peduncles ; *peduncles* slender, angles obtuse and smooth below, more acute and scaberulous above. *Bracts* foliaceous, lower much exceeded by the stem, upper reduced but some slightly exceeding the stem ; *sheaths* membranous, brown, hispidulous at the mouth. *Spikes* androgynaeceous, rather numerous, slenderly cylindric,

Source : MNHN, Paris

t-4 cm long, male part about as long as to considerably shorter than the female. *Bracteoles* indistinguishable from the glumes or sometimes more longly awned. *Female glumes* ovate to more or less oblong, cymbiform or flattish above, with a triangular to rounded apex, 2.75-4 mm long, 1.25-2.5 mm wide, stramineous to pale golden-brown, sometimes castaneous, with widely whitish-hyaline margins above, especially round the ciliolate-erose apex, glabrous, or hispidulous above, slenderly nervose, midrib, coalescing with 2 adjacent nerves above, extending to the apex or excurrent from below it in a hispidulous mucro or awn up to 1 mm long. *Utricles* narrowly ellipsoid or oblong-ellipsoid to obovoid but tapering below, 3.5-5.5 mm long, 1-1.8 mm broad, very narrowly marginate, base glabrescent, otherwise pale, hispidulous, straight to slightly recurved, becoming patulous, stramineous-brown, base dark reddish-brown, scarcely to shortly stipitate ; *beak* slightly tapering, 1-1.5 mm long, scarcely to narrowly marginate, hispidulous below, glabrous or glabrescent above; *lobes* short, straight, whitish-hyaline, becoming erose. *Achene* ellipsoid to obovoid but tapering below, angles conspicuous, faces flattish, 2.5-3 mm long, 1-1.75 mm broad, stramineous, becoming warm brown to blackish overlaid pale-scurfy, base pale, not stipitate, apex slightly tapering, scarcely to very shortly pale- and sometimes slightly bent-beaked. *Style*-base slightly thickened.

Tongking : forests of Mt. Bavi, ± 900 m., 28 Oct. 1887, *Balansa* 2814 (P) ! Lang-son, *d'Alleizette* ; Massif of Nan Son, Jan. 1925, *Petelot* 1754 (BOG) !

Annam : Dalat, Elephant Mountain path, Prenh stream, 29 Nov. 1924, *Evrard* 1932 (K, P) !; summit of Nui Bach Ma high level station, a little south of Hué, rather poor schistous-clay soil, old forest, 1400-1500 m., 9 Sept. 1938, *Poilane* 27,702 (K, P) !; boundary of the provinces of Quang-nam and Kontum ; between the villages Hoi of Mang-lum and Tu-inh, in large forest, granitic soil, 1500-1800 m., 5 March 1941, *Poilane* 32,016 (K, P) ! *Poilane* 27,702 and 32,016 are doubtfully placed here.

Sumatra, Borneo.

### 40. *Carex phyllocaula* Nelmes.

*Carex phyllocaula* Nelmes in *Kew Bull.* 1946 : 21, 25 (1946). — Thailand, *Kerr* 6615.

Tufted. *Rhizome* absent. *Stems* apparently very long (lower part unknown), smooth, leafy. *Leaves* unknown except 2-3 in the upper part of the stem, below the inflorescence, which are 10-15 cm apart, extending up to the apex of the inflorescence, about 4 mm wide, flattish, apex longly attenuated ; *sheaths* tight, smooth. *Inflorescence* a terminal, rather lax and slender, compound panicle, interrupted below, continuous above, 24-26 cm long ; *secondary panicles* erect or suberect, 7 or 8, single, 2-10 cm long, lowest 1-2 distant, remainder

Source : MNHN, Paris

subapproximate and fastigiate, lower on longly or very longly exserted peduncles, upper scarcely to shortly peduncled, branches in the form of simple spikes or lower sometimes bearing also 1-2 lateral spikes ; *peduncles* slender, smooth. *Rhachis* of the main and secondary panicles smooth, or minutely scaberulous on the angles. *Bracts* mostly slightly exceeding the whole inflorescence, lower foliaceous, upper much reduced. *Spikes* rather numerous, androgynaeceous, slenderly cylindric, 1.5-2 cm long, subdense-flowered, erect or suberect, sessile to subsessile, male part equalling or slightly longer than the female part. *Bracteoles* glumiform, more or less oblong, midrib excurrent in a setaceous, very long, straightish or reduced awn. *Cladophyllls* ocreiform below, glumiform above. *Female glumes* ovate to ovate-lanceolate, cymbiform above, apex acute to obtuse, 3-4 mm long, 1.75-2 mm wide, glabrous, warm brown, margins widely whitish, slenderly nervose, midrib excurrent in a setaceous awn, 1.5-4.5 mm long. *Utricles* ellipsoid-lanceolate, tapering above and below, 5-6 mm long, about 1 mm broad, glabrous to hispidulous below on the ventral face, glabrous on much of the dorsal face, otherwise hispidulous, including the margins, narrowly marginate, straight, suberect, spongy and subconically about 0.75 mm long stipitate, beaked ; *beak* tapering, 1.5-2 mm long, densely hispidulous below, sparsely so above, apex glabrescent. *Achene* ellipsoid-obovoid, angles prominent, faces flattish, about 2.5 mm long and 1 mm broad, pale brown with a whitish, slightly scurfy surface, scarcely stipitate, *beak* about 0.3 mm long, bent and twisted. *Style*-base inflated-bulbous.

Thailand : N. Thailand ; Chiengmai, Doi Chiengdao, in open ground, 6 Nov. 1922, *Kerr* 6615 (BM, K)!

### Sect. 12. **Borneënses** Nelmes
### in *Kew Bull.* 1951 : 121 (1951).

Tufted. *Stems* surrounded at the base by spadiceous cataphylls. *Leaves* often covered with rough protuberances above, stiff and subcoriaceous. *Spikes* 2-6, androgynaeceous, 2-5.5 cm long, single or middle ones binate, simple, lower longly peduncled. *Bracts* sheathing. *Female glumes* more or less oblong-ovate or oblong-lanceolate, base strongly incurved, apex often obtuse to rounded or subtruncate, frequently subadpressed-hispidulous, brownish, often with wide whitish margins, usually aristate. *Utricles* usually ellipsoid, distinctly trigonous, multinerved, usually subadpressed-hispidulous, greenish, often becoming brownish ; *beak* long, bilobed ; *mouth* usually oblique, sometimes extremely so. *Stigmas* 3.

Only Indo-Chinese species ..... 41. *C. kinabaluensis.*

### 41. *Carex kinabaluensis* Stapf.

*Carex kinabaluensis* Stapf in *Journ. Linn. Soc. Bot.* 42 : 182 (1914) ; Nelmes, 349. — Borneo, *Gibbs* 4240.

Source : MNHN, Paris

Loosely tufted. *Rhizome* short. *Stems* erect or suberect, 40-138 cm tall, 0.75-1.25 mm thick, smooth. *Leaves* subbasal, except for 1-3 higher on the stem, much shorter than to slighlly exceeding the stem, 3-9 mm wide, flat to revolute, upper surface covered with minute setae above, apex longly attenuated ; basal *sheaths* often minutely hispidulous, especially al the dark brown, membranous mouth, nerves reddish-brown to blackish on the back. *Inflorescence* consisting of 2-6 spikes, single or middle ones binate, occupying the upper 6.5-32 cm of the stem. *Spikes* erect to suberect, upper 2-4 approximate, fastigiate, lower distant to remote, cylindric, simple, 2-5.5 cm long, male part 1-1.5 mm thick, female part 5-6 mm thick, usually about half as long as but sometimes longer than the male part, sometimes nearly wholly male, lower on longly or very longly, upper on scarcely to shortly, exserted peduncles ; *peduncles* slender, smooth or angles slightly scaberulous. *Bracts* of the lower spikes foliaceous or subherbaceous and filiform, upper reduced to glumiform, minutely hispidulous *sheaths*, with long, setaceous awns, lower longer upper shorter than their spikes, lower with long, green *sheaths*, hispidulous near the mouth. *Female glumes* oblong, oblong-ovate or ovate-lanceolate, cymbiform, acuminate, apex subacute to obtuse, sometimes subtruncate, 2.5-4 mm long, 1.75-2.25 mm wide, glabrous or glabrescent below, sparsely hispidulous above, or wholly hispidulous, light castaneous-brown, margins widely pale, becoming erose, nervose, midrib, with 2 adjacent nerves coalescing above, excurrent in a hispidulous-margined awn, 0.5-2.5 mm long. *Utricles* ellipsoid, or ellipsoid-lanceolate, (5.5-) 7-8 mm long, 1-2 mm broad, very narrowly marginate, base glabrous or glabrescent, otherwise hispidulous, straight or straightish, becoming subpatulous, tapering below lo a spongy, scarcely to shortly stipitate base ; *beak* gradually or scarcely tapering, plano-convex or subterete, 2-3 mm long, sparsely hispidulous margined. *Achene* oblong-ellipsoid, dark reddish-brown, sometimes with darker spots, about 4 mm long, 1.5-1.75 mm broad, shortly pale-stipitate and pale-beaked ; *beak* sometimes bent, up to 0.4 mm long. *Style*-base not or slightly thickened.

Annam : north of Kontum prov., summil of Ngee Pang, granitic soil in primitive forest, above 2000 m., 8 March 1941, *Poilane* 32,153 (P) !

Borneo.

### Sect. 13. **Graciles** Tuckerm.,
### Enum. Melh. 10 : 1843.

Tufted. *Rhizome* slender, rarely elongate. *Stems* slender or very slender hut firm. *Leaves* narrow. *Spikes* androgynaeceous, simple or branched, often in fascicles, lax- lo subdense-flowered, on slender peduncles, erect to somewhat cernuous. *Bracts* sheathing. *Utricles* usually elliptic, plano-convex, less often biconvex, often hispidulous,

Source : MNHN, Paris

erect to subpatulous, nervose, usually conspicuously and cuneate-stipitate and longly beaked. *Stigmas* 2, slender, often long or very long.

Spikes single at each of 1-7 nodes ; utricles 5-7 mm long, glabrous .. ..... 44. *C. longipes.*

Spikes in fascicles of 1-5 at each of 3-8 nodes ; utricles 2.75-5 mm long, sparsely whitish-setulose :

Stigmas 7-10 mm long ..... 42. *C. teinogyna.*

Stigmas about as long as the utricles (2.75-4.75 mm long) ..... ..... 43. *C. brunnea.*

### 42. *Carex teinogyna* Boott.

*Carex teinogyna* Boott, Illustr. t : 60, t. 158 (1858) ; C. B. Clarke in Hook. f., Fl. Brit. Ind. 6 : 705 (1894) ; Kükenth. in Engl. Pflanzenr. IV, 20 ; 602, fig. 104 (F-H) (1909). — India, *Hooker and Thomson.*

*Carex teinogyna* Boott var. *scabriculmis* Kükenth., l. c., 602. — Japan, *Faurie* 4385 ; Korea, *Faurie* 1316.

*Carex scabriculmis* (Kükenth.) Ohwi in *Acta Phytotax. et Geobot.* 2 : 27 (1933) ; Nelmes in *Kew Bull.* 1926 : 17, 26 (1926).

Tufted. *Rhizome short.* Stems more or less erect, 20-60 cm tall, 0.5-1 mm thick, smooth throughout or angles scaberulous above and on the rhachis, surrounded at the base, below the leaves, by spadiceous sheaths or cataphylls, which later fray into persistent fuscous fibres. *Leaves* basal and subbasal, shorter to slightly longer than the stems, 1.5-4 mm wide, flat to conduplicate, upper surface covered with pale asperous protuberances, especially above, apices longly attenuated ; *sheaths* dark brown in front and at the concave mouth. *Inflorescence* a slender, continuous to interrupted panicle, consisting of 3-6 fascicles, each fascicle consisting of 1-3 spikes, mostly simple but sometimes bearing 1-few smaller spikes, and occupying the upper 9-27 cm of the stem, upper fascicles subapproximate and overlapping, lower at more widely spaced nodes. *Spikes* 0.5-2.5 cm long, female part exceeding usually much exceeding the male part, which is 0.5-1 mm thick, female part 2-3 mm thick, upper on scarcely to very shortly lower on very shortly to rather longly exserted peduncles ; *peduncles* of each fascicle unequal in length, smooth or scabrid. *Bracts* of the lower fascicles foliaceous or subfoliaceous, mostly longer than their fascicles but usually shorter than the whole inflorescence, upper bracts much reduced. *Female glumes* more or less oblong-lanceolate or obovate-oblong, apex acuminate, acute, or sometimes obtuse, 3.5-5 mm long, 1.2-1.8 mm wide, glabrous, castaneous, sometimes narrowly pale-hyaline on the apical margins, slenderly nervose, muticous or awned, awn up to 1 mm long. *Utricles* elliptic, 3.5-5 mm long, 1-1.5 mm broad, not or very narrowly marginate, sparsely minutely whitish hispidulous, straight or straightish, castaneous, subabruptly

Source : MNHN, Paris

beaked ; *beak* gradually tapering, compressed, 1.25-2 mm long, very narrowly marginate, sparsely setulose-margined below, usually glabrous above, more or less hispidulous, bidentate or bidentulate ; *teeth* straight. *Achene* elliptic or oblong-elliptic, subplano-convex or compressed-biconvex, 1.8-2.5 mm long, 1-1.25 mm broad, becoming dark brown, not stipitate, scarcely or shortly beaked. *Style*-base thickened. *Stigmas* about 7-10 mm long, curved and flexuous, persistent.

Tongking : banks of the great torrent, ± 850 m., near Muong Xen, from Lao-kay to Chapa, 25 Sept. 1943, *Petelot* 8545 (K) !

Annam : Moi, Bhonbi, forest, bed of the Song tan west of Nhatrang, 1200 m., 27 May 1922, *Poilane* 3763 (K, P) !

India, Japan, Sumatra.

*C. teinogyna* and one or two of its allies differ from most other sedges in possessing extremely long stigmas. They share this distinction with *C. sadoënsis* Franch. and *C. rubro-brunnea* C. B. Clarke, species which belong to Sect. *Acutae* Fries, a group which does not otherwise closely resemble Sect. *Graciles*, except that the species of both bear flowers with but two stigmas, with the resulting plano-convex or biconvex fruits. Almost all the other sections of Subgen. *Eucarex* are composed of plants whose flowers have three stigmas and whose fruits are trigonous. Thus we have a hint of a closer relationship between Sect. *Acutae* and Sect. *Graciles* than has hitherto been recognised.

### 43. *Carex brunnea* Thunb.

*Carex brunnea* Thunb. Fl. Japon. 38 (1784) ; Schkuhr, *Riedgr.* 2 : 16, t. xx, fig. 111 (1806) ; C. B. Clarke, 5 ; Kükenth., 599 ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 194 (1922) ; Nelmes, 357. — Japan.

Tufted. *Rhizome* short, clothed with dark, nitidous, sheathing scales or their fibrous remains. *Stems* erect to oblique, obtusely trigonous, slenderly ribbed, finely striate, 40-104 cm tall, 1-1.75 mm thick below, smooth and sometimes also above, scaberulous above or only on the upper part of the rhachis, surrounded, below the leaves, by longish, dull, olive-brown, scurfy, firm cataphylls, brown and nitidous inside, membranous front tending to split into somewhat reticulate fibres. *Leaves* basal and subbasal, shorter to longer than the stem, 1.5-4 mm wide, flattish, stiff, upper surface usually covered with small protuberances which are scabrid above, apex attenuated, firm. *Inflorescence* a rather slender, continuous to interrupted panicle, consisting of 4-8 *fascicles*, each fascicle consisting of 1-5 spikes, one at each node usually longer than the others, especially below, with 2-5 smaller spikes branching from it, and occupying the upper 6-56 cm of the stem, upper fascicles subapproximate and some fastigiate, lower rather distantly spaced. *Spikes* 0.7-4.5 cm long (including branched spikes), female part usually very much exceeding the male part, which



Source : MNHN, Paris

is 0.5-1 mm thick, female part 2-4 mm thick, upper on scarcely or shortly lower on longly exserted peduncles ; *peduncles* smooth to scaberulous. *Bracts* of the fascicles foliaceous or subfoliaceous, longer than their fascicles but much shorter than the whole inflorescence, upper bracts reduced, uppermost 1-2 reduced to large, longly awned glumes ; *sheaths* dark brown or castaneous and concave at the mouth. *Female glumes* oblong-ovate, ovate, or ovate-lanceolate, cymbiform but margins involute, apex acute to obtuse, 2.5-4 mm long, 1.25-1.5 mm wide, slenderly nervose, glabrous, light to reddish-castaneous, margins above not or sometimes very narrowly whitish, often erose, midrib keeled, green, extending nearly or quite to the apex. *Utricles* ovate, oblong-elliptic, elliptic, or suborbicular, 2.75-4.75 mm long, 1.2-1.5 mm broad, narrowly marginate, minutely and rather sparsely whitish-setulose, straight or straightish castaneous to cinnamomeous-brown, abruptly or subabruptly beaked ; *beak* slightly or scarcely tapering, plano-convex or compressed, 0.5-1 mm long, narrowly or scarcely marginate, setulose margined, bidentulate ; *teeth* becoming erose. *Achene* elliptic, ovate, oblong-ovate, or suborbicular, compressed, 1.75-2.25 mm long, 1.2-1.4 mm broad, stramineous, not stipitate, not or scarcely beaked. *Style*-base somewhat thickened. *Stigmas* up to about as long as the utricle.

Tongking : *Brousmiche ;* towards Ninh-binh, *Bon* ; West Tonkin ; Kiên Khê on Mt. Dong Ham, 19 Nov. 1883, *Bon* 2303 (K, P) ! ; ibid.. Thinh Thau, dry mountain slopes, 19 Sept. 1884, *Bon* 2730 (P) ! ; ibid., Luong Xa, dry mountain slopes, 23 oct. 1885, *Bon* 3049 (P) ! ; ibid., Thinh Thau, 22 Oct. 1890, *Bon* 4514 (P) ! ; rocks of the Tief in the middle of the bed of Moc-ha torrent, 6 Oct. 1891, *Balansa* 4939 (P) !

India, Upper Burma, China, Japan, Queensland.

### 44. *Carex longipes* D. Don.

*Carex longipes* D. Don in *Trans. Linn. Soc.* 14 : 329 (1825) ; Drejer, Symb. Caric. 24, t. 10 (1844) ; Kükenth., 603 ; Nelmes, 361. — India, *Wallich.*

Tufted or densely tufted. *Rhizome* very short. *Stems* erect, obtusely to obscurely angled, 13-77 cm tall, 0.5-1.5 mm thick below, straightish to flexuous, smooth except below the nodes of the upper spikes, where the angles are scaberulous, surrounded at the base, below the leaves, by persistent fibrous remains of old leaf-sheaths. *Leaves* basal and subbasal, rarely 1 leaf higher up the stem, mostly shorter to much shorter but some a little longer than the stems, 1.5-6 mm wide, flat or flattish or margins revolute, apices attenuated ; *sheaths* truncate and membranous, sometimes minutely scurfy-hispidulous, at the mouth. *Spikes* 1-7, male part very short, except sometimes in the terminal spike, where it may be nearly the uppermost third, sometimes 1-3 lower « spikes » bave 2-3 short spikes at their

Source : MNHN, Paris

base, cylindric to lanceolate, 1-3.5 cm long, female part 4-7 mm thick, male part very slender, upper 2-4 approximate and fastigiate, remainder distant, lowest sometimes from a basal node, upper lateral 1-2 spikes sessile or subsessile or on shortly exserted peduncles, lower on rather shortly to very longly exserted peduncles ; *peduncles* very slender to filiform, sometimes curved or flexuous, minutely scaberulous above. *Bracts* of the lower spikes foliaceous, nearly always falling far short of the apex of the stem, upper bracts much reduced, subfoliaceous or aristate-glumiform ; *sheaths* minutely hispidulous at the mouth or glabrous. *Female glumes* ovate-lanceolate to oblong-ovate-lanceolate, cymbiform or sometimes flattish, margins often involute above, apex usually subtruncate-obtuse, sometimes subacute or bilobed-emarginate, 3.25-5 mm long, 1.5-2 mm wide, nervose, light ferrugineous or paler, with very narrow to wide whitish-hyaline margin, and a 3-nerved, darker brown central stripe, the midrib, which is sometimes hispidulous above, coalescing with 2 adjacent nerves and excurrent as a hispidulous-margined awn 0.25-5 mm long. *Utricles* elliptic, 5-7 mm long, 1.5-2 mm broad, marginate, glabrous, straight, pale yellowish-green, becoming light reddish-brown, cuneate below, base spongy-thickened but scarcely stipitate, subabruptly beaked ; *beak* gradually then scarcely tapering, compressed, 2-3 mm long, narrowly marginate, sparsely hispid-margined above, deeply bidentate, often dorsally narrowly grooved ; *mouth* not or slightly ventrally oblique ; *teeth* lanceolate-setaceous, whitish-hyaline above, glabrous, straight. *Achene* broadly elliptic to oblong-elliptic or oblong-ovoid, sometimes subobovoid, compressed-biconvex or planoconvex, 2.3-3 mm long, 1.5-1.8 mm broad, dirty-whitish on reddish-brown, subabruptly stoutly 0.25-0.3 mm stipitate, abruptly beaked ; *beak* subterete, 0.1-0.2 mm long, scarcely annular thickened at the apex. *Style* thickened into an oblong, centrally grooved, compressed basal portion. *Stigmas* up to 3 or 4 mm long.

Tongking : Chapa, *Petelot* 1610 (P) ! ; ibid., grassy savannahs, ± 1900 m., April 1938, *Petelot* 7371 (K).

India, China, Malaysia.

### Sect. 14. *Cryptostachyae* (Ohwi) Nelmes
in *Reinwardtia*, 1 : 363 (1951).

Subsect. *Cryptostachydae* Ohwi in *Mem. Coll. Sci. Kyoto Imp. Univ.*, ser. B, 11 : 340 (1936).

*Flowering stems* few to numerous, arising singly or binate from the axils of leaves produced on a short shoot, usually single, sometimes binate, often flexuous, subscapose. *Spikes* androgynaeceous. *Bracts* subherbaceous ; sheaths tubulose-infundibuliform. *Female glumes* involvent-cucullate. *Utricles* obovoid or obovoid-fusiform, concave-facetted (thus conforming to the achene). *Achene* deeply concave-faceted, medianly on the 3 angles, apically and basally on the

Source : MNHN, Paris

faces ; beak strongly deflexed. Lower part of *style* bent down with beak of achene, upper part bent and twisted upwards, thickened, flattened, and papillose at the apex (below the 3 stigmas).

Only species ..... 45. *C. cryptostachys.*

### 45. *Carex cryptostachys* Brongn.

*Carex cryptostachys* Brongn. in Duperrey, Voy. Coquille, Bot. 152, t. 25 (1828) ; Boott, Illustr. 2 : 103, t. 310 (1860) ; C. B. Clarke, 8 ; Kükenth., 471 ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 195, fig. 27 (10-13) (1922) ; Nelmes, 363. — New Guinea, Waigeo, *d'Urville.*

Tufted. *Rhizome* erect or oblique to horizontal, 4-6 mm thick, clothed with fibrous remains of sheaths. *Stems* suberect, often flexuous, more or less hidden in the leaf-sheaths, compressed-trigonous, 10-50 cm tall, smooth below the rhachis, base clasped by a few ferrugineous bract-like sheaths. *Leaves* crowded on a short shoot and very much longer than the flowering stems, 3-18 mm wide, flat, apex very longly attenuated, sparsely septate-nodulose, surrounded at the base by withered, fibrous remains of older leaves ; *sheaths* ferrugineous. Spikes 8-30, erect to subercct, male part much shorter than the female, cylindric, 1-3 cm long, 3-4 (5) mm thick, lax-flowered, sometimes all simple, usually lowest or lower on elongated branches, each bearing up to 8 but usually about 4 spikes, subapproximate, often overlapping and subfastigiate, upper on included lower on shortly exeluded peduncles, the whole forming a slender, scarcely interrupted inflorescence 10-40 cm long ; *peduncles* slender, angles sparsely scaberulous. *Rhachis* often flexuous, very sparsely scaberulous. *Bracts* usually much shorter than their spikes, upper shortly lower longly sheathing ; *sheaths* thinly brownish-membranous. *Female glumes* ovate to oblong-ovate, apex acute to subacute, 2.25-2.75 mm long, about 2 mm wide, often minutely adpressed-hairy, especially above, whitish stramineous tinged brown, margins ciliolate, especially above, midrib usually hispidulously mucronate. *Utricles* obscurely trigonous to more or less biconvex, 3.5-5.5 mm long, 1.5-2 mm broad, multinerved, narrowly marginate, ventrally sparsely whitish puberulous above, dorsally almost glabrous to somewhat scurfy, margins ciliolate especially above, subpatulous, stramineous-green tinged brown, longly stipitate, subabruptly beaked ; *beak* subterete to plano-convex, 0.4-0.75 mm long, marginate, glabrous or glabrescent ; *mouth* very oblique. *Achene* ellipsoid to rhomboid-ellipsoid, or oblong-obovoid, equally divided by three longitudinal, rounded, pale to brown ribs, faces becoming dark brown, with sometimes a wrinkled, warty band round the middle, base thickening, after contraction, into a round spongy mass, or sometimes passing gradually into a thick basal subcylindric stipe ; *beak* short.

Thailand : Pen. Thailand ; Satul, Khao Kheo range, ± 700 m., evergreen forest, 12 March 1928, *Kerr* 15,736 (K) ! ; Satul, Klawng

Source : MNHN, Paris

Ton, ± 100 m., common in evergreen forest, 16 March 1928, *Kerr* 14,628 (K) ! — S. E. Thailand ; Trat, Kaw Chang, Klawng Non Si, ± 500 m., evergreen forest, 26 Sept. 1924, *Kerr* 9189 (BM, K) !

Tongking : Mt. Bavi ; Lankok Valley, in forest, 12 March 1887, *Balansa* 2822 (K, P) ! ; ibid., Banton Valley, near Tu-vu, in forest, 27 Dec. 1887, *Balansa* 2823 (K, P) ! Phu Tho prov. ; Phu Ho forest, March 1923, *Petelot* 1332 (P) ! ; Phu Ho, *Petelot* 6111 (P) ! ; Bac Giang prov. ; Lang Met, May 1925, *Petelot* 6137 (P) ! ; Quangtu prov., Dong Tri, near Pho Lu (Laokay prov.), 1000 m., Jan. 1936, *Poilane* sine num. (K, P) !

Annam : Tourane ; Jan. 1837, *Gaudichaud* 70 (P.) ! Thua-thien prov. ; Lang Co, waterfalls and torrents, *Eberhardt* 2551 (K, P) ! ; ibid., Thua Lun, *Eberhardt* 2677 (P) ! Quang Tri prov. ; valley of the high river On-Bi, *Eberhardt* 2048 (P) ! Hué, West River, rocky mountain jungle, 100 m, only one plant seen, Feb. 1922, *Squires* 118 (P) ! Thua Thien prov. ; Cay chua, Luong Dien canton, in forest on sandy-clay soil, 4 Feb. 1920, *Poilane* 934 (K, P) ! Haut Douai prov. ; Laonan canton, fairly good clay soil, in forest, 1200 m, 5 June 1933, *Poilane* 22,610 (P) ! Dong Tri, near Quangtri, forest, rather poor clayey-schistous soil, 900 m, 10 March 1936, *Poilane* 25,314 (K, P) ! ; Nui Bach Ma Altitude Station, near Hué, 14 April 1939, *Poilane* 29,621 (P) ! ; near the village Moi of Go-Oi, south-west of Quang Nam prov., granitic soil, ± 500 m, 22 Feb. 1941, *Poilane* 31,468 (P) ! ; south of Quang Nam prov., near the village Moi of Mangtra, forest, granitic soil, ± 1500-1800 m, 26 Feb. 1941, *Poilane* 31,815 (P) ! ; ibid., 1500 m, 27 Feb. 1941, *Poilane* 31,852 (P) ! ; between the villages Moi of Mang-Lum and Tu inh (limit of Quangnam and Kontum provinces), large forest, granitic soil, climate rainy, 1500-1800 m, 5 March 1941, *Poilane* 32,017 (P) ! Kontum prov., between Dak Dru Dak and Dak Bon Không, west of Dak Gley, primitive and high forest, good granitic-schist soil, climate very wet, foggy and humid, 1000-1100 m, 30 Jan. 1947, *Poilane* 32,908 (K, P) !

Hongkong, Formosa, Malaysia, Queensland.

### Sect. 15. **Lageniformes** (Ohwi) Nelmes in *Reinwardtia*, 1 : 366 (1951).

Subsect. *Lageniformes* Ohwi in *Mem. Coll. Sci. Kyoto Imp. Univ.*, ser. B, 11 ; 340 (1946).

*Stems* central or arising from the axils of basal leaves, slender or weak and very slender, subscapose, or leafy below. *Leaves* moderately to very much longer than the stems. *Spikes* usually few, terminal male, remainder androgynaeceous or female. *Bracts* foliaceous to subherbaceous ; sheaths sometimes subtubular or infundibuliform. *Female glumes* usually more or less oblong-ovate. *Utricles* more or less lageniform or rhomboid-lageniform. *Achene* with a

Source : MNHN, Paris

central transverse ridge, sometimes with an apical cylindric neck, usually discoid-annulate but sometimes truncate at the apex, 0,7-1 mm in diameter. *Stigmas* 3.

Stems central, developed from a leafy shoot ; lateral spikes often androgynaeceous :

Leaves 3-6.25 mm wide ; terminal spike 10-22.5 mm long, lateral androgynaeceous or female ..... 49. *C. breviscapa.*

Leaves 1-3 mm wide ; terminal spike 8-10 mm long, lateral androgynaeceous ..... 48. *C. rhynchachaenium.*

Stems axillary or lateral at the base of a leafy shoot ; lateral spikes female :

Stems 5-30 cm tall ; inflorescence 4.5-9.5 cm long ; lateral spikes 1.2-2 cm long ..... 46. *C. pleurocaula.*

Stems 5-7 cm tall ; inflorescence 1-1.3 cm long ; lateral spikes 0.5-1 cm long ..... 47. *C. lageniformis.*

### 46. *Carex pleurocaula* Nelmes.

*Carex pleurocaula* Nelmes in *Kew Bull.* 1946 : 7, 26 (1946). — Annam, *Evrard* 944.

Tufted. *Rhizome* very short, clothed with the fibrous remains of sheathing scales. *Stems* erect to suberect at first, curved and sometimes flexuous later, twisted, arising singly or more than singly from the axils of basal sheaths of old leaves, angles obtuse or compressed, 5-30 cm tall, 0.5-1 mm thick, smooth, with a few subherbaceous leaves and leafless sheaths near the base. *Leaves* 12 or more, arising from a short shoot, 20-50 cm long or longer, 4-7 mm wide, flat or margins revolute, apices longly attenuated. *Spikes* 4-6, single, upper approximate or subapproximate and fastigiate, 3 lowest at nodes 2-3.5 cm apart, usually occupying the upper third to half of the stem, or the lowest remote, forming except for this basal spike, a loose, oblong inflorescence, 4.5-9.5 cm long and 1-1.5 cm broad, terminal slenderly cylindric, acuminate towards the apex, 1-1.5 cm long, dense-flowered, slightly exceeding to slightly exceeded by the uppermost lateral spike, remaining spikes female, 1.2-2 cm long, 3-5 mm thick, subdense-flowered, suberect to patulous, on scarcely to rather longly exserted peduncles. *Rhachis* minutely setulose, especially on the angles. *Bracts* of the lower lateral spikes subherbaceous, much shorter than the whole inflorescence, shorter to longer than their spikes, upper much reduced. *Female glumes* oblong, oblong-ovate, or oblong-lanceolate, flattish or involute-cymbiform, especially above, apex acute to obtuse or very obtuse, 2-4 mm long, 1-1.5 mm wide, glabrous, light brown but upper margins rather widely whitish, midrib usually excurrent in a flattish ciliolate mucro up to 0.75 mm long. *Utricles* more or less ellipsoid, obovoid, or fusiform in the lower two-thirds,

Source : MNHN, Paris

slightly constricted above, with a more slender upper third, which is more or less ellipsoid-tubiform or conic-tubiform, not or scarcely angled, the whole utricle being more or less lageniform, 4.5-5.8 mm long, 1.1-1.3 mm broad, nullinerved, puberulous above or wholly subdensely hirtillous, straight, subpatulous, tapering below to a slightly rounded base, shortly to rather longly stipitate, gradually tapering above to a flattish, 0.5-1 mm long, ciliolate-setulose-margined, bidentulate *beak*. *Achene* oblong-ellipsoid, oblong-obovoid, or rhomboid-quadrate-ovoid, angles prominent, usually slightly broadest just below the middle, along an interrupted rounded transverse ridge across the three faces, deeply concave on the three faces below the ridge and on one above, the remaining two upper faces shallowly concave to slightly convex, 3-3.75 mm long, 1-1.2 mm broad, tapering below and abruptly contracted at the base into an oblong-trigonous to cylindric, pseudo-stipe, which is 0.3-0.7 mm long, tapering gradually above from the transverse ridge, and, near the apex, subabruptly or abruptly constricted into an extremely short (about 0.1 mm) cylindric or trigonous-cylindric neck, 0.3-0.9 mm in diameter, which abruptly expands into an inverted-umbelliform, subtruncate, annulate, slightly involute-margined apex, neck and stipe sometimes bent, achene brown with pale angles, stipe, and neck. *Style*-base slightly pyramidally thickened.

Tongking : Prov. of Roo Kay ; open forest, ± 200 *m*, between the shoulder of the Lo Qui Ho and Chu Valley, July 1943, *Petelot* 8549 (K) !

Annam : Camchay, ? 900 m, ? May ? 1874, *Pierre* (K) ! Dalat, in wood-mould, 23 June 1924, *Evrard* 944 (K) !, by Robinson's arboretum, wooded clay slope, 1 Dec. 1924, *Evrard* 1969 (K) !

### 47. *Carex lageniformis* Nelmes.

*Carex lageniformis* Nelmes in *Kew Bull.* 1939 : 658 (1939) et 1946 : 7, 26 (1946). — Thailand, *Kerr* 9647.

Tufted. *Rhizome* horizontal, curved upwards at the end, short, clothed with the fibrous remains of sheathing scales. *Stems* erect at first, later curved and sometimes flexuous and twisted, lateral, arising singly from the base of a short, leaf-bearing shoot, angles compressed, 5-7 cm tall, weak, 0.5-1 mm thick, smooth, with few very small subherbaceous leaves near the base, surrounded, at the base, by very few leafless sheaths or cataphylls. *Leaves* about 12, arising from a short shoot, rather crowded, 20-55 cm long, 4-7 mm wide, flat or flattish, apex longly attenuated. *Spikes* (3) 4-5, single, in a fasligiate, more or less obpyramidal head which is 1-1.3 cm long and 1.2-1.3 cm broad, terminal much smaller than and hidden among the lateral spikes, which are female, 5-10 mm long and 3-5 mm thick, lax-to subdense-flowered, lower patulous to subpatent, upper erect to suberect, on scarcely or shortly exserted peduncles. *Bracts* of the lateral spikes

Source : MNHN, Paris

subfoliaceous to subherbaceous, lower about twice the length of the whole inflorescence, upper about equalling their spikes. *Female glumes* oblong-lanceolate, flattish or involute-cymbiform, especially above, pale, acute, rarely subobtuse, 2.25-2.5 mm long, 0.8-1 mm wide, whitish, midrib scarcely excurrent but forming a firm tip at the apex. *Utricles* rhomboid-lageniform-lanceolate, angles compressed, broadest below the middle with a secondary expansion about halfway between this point and the apex of the beak, 4.5-5.25 mm long, 1.1-1.75 mm broad, multinerved, puberulous, straight, patulous, tapering below to a slightly rounded base, very shortly stipitate, gradually tapering above to a flattish, 0.5-1 mm long, sometimes sparsely ciliolate-setose-margined, bidentulate *beak*. *Achene* rhomboid or quadrate-ovoid, angles prominent, broadest below the middle, along a prominent rounded transverse ridge across the three faces, deeply concave on the three faces above and below the ridge, about 3 mm long, 1.1-1.2 mm broad, tapering below and abruptly contracted at the base into an oblong-trigonous pseudo-stipe, about 0.5 mm long, tapering gradually above from the transverse ridge, and near the apex rounded and abruptly constricted into an extremely short (about 0.1 mm) cylindric neck, 0.3-0.9 mm in diameter, which abruptly expands into an inverted-umbelliform, subtruncate, annulate, slightly involute-margined apex. *Style*-base pyramidally thickened.

THAILAND : S.E. Thailand ; Chantabun ; Kao Soi Dao, c. 1400 m, in evergreen forest, 13 Dec. 1924, *Kerr* 9647 (K) !

The following taxa were published in the Notizbl. Bot. Gart. Berl. 14 : 191 (1938) :

*Carex tristachya* Thunb. var. *pseudopocilliformis* R. Gross. — Tongking : Chapa, about 1500 m, *Petelot* 1795, April 1925.

*Carex ligata* Boott var. *indochinensis* R. Gross. — Ibid., forest, *Petelot* 6140, Sept. 1929.

Some time between the two world wars I saw the Berlin sheets of these plants and formed the opinion that they both belonged to a group I have since raised to sectional rank from Ohwi's subsection *Lageniformes*, which includes *C. ligata* Boott but not *C. tristachya* Thunb. I further found that the two Petelot gatherings agreed closely with the description of *C. gracilispica* Hayata, a Formosan sedge which I had not and have not seen. The Berlin specimens above-mentioned may not now exist, and the two numbers were not included in the Indochinese *Carices* loaned to me from Paris, so that I am unable with confidence to place them precisely.

### 48. *Carex rhynchachaenium* Merrill.

*Carex rhynchachaenium* C. B. Clarke ex Merrill in *Bull. Dep. Bur. Gov. Labor. Manila* No. 35, 5 (1905) ; Kükenth., 480 ; Nelmes, 368. — Philippine Islands, *Elmer* 6983.

Densely tufted. *Rhizome* short. *Stems* subflexuous, central, 3.5-30 cm tall, 0.25-0.5 mm thick below, smooth below, scaberulous on

Source : MNHN, Paris

the more distinct angles above, surrounded, below the leaves, by fibrous remains of old leaf-sheaths. *Leaves* basal, crowded, longer than the stems, 1-3 mm wide, flat-plicate or flattish, margins sometimes slightly revolute, apices longly attenuated ; *sheaths* pubescent on the back and on the membranous front. *Spikes* 3-5, somewhat hidden among the leaves, upper 3 at approximate to more widely separated nodes but fastigiate or subfastigiate because of the lower being longer-pedunculed, lower 1-2 remote and subradical from basal leaf-sheaths, cylindric, suberect, lax-flowered, terminal 8-10 mm long, rather less than 1 mm thick, others androgynaeceous, male part usually much shorter than the female, single, 6-15 mm long, female part 3-4 mm thick, upper on shortly lower on shortly to longly exserted peduncles ; *peduncles* smooth or angles scaberulous. *Bracts* of the lower spikes foliaceous, exceeding to far exceeding the terminal spike, bract of the upper spike much reduced, shorter to longer than its spike ; *sheaths* glabrous to minutely pubescent. *Female glumes* oblong-ovate to oblong-lanceolate, or triangular with a rounded apex to triangular-acuminate and acute, cymbiform, margins sometimes involute above, 2-3 mm long, 1-1.5 mm wide, nervose, pale brownish, margins widely whitish-hyaline, glabrous to sparsely setulose, midrib not extending to the apex of the obtuse or rounded apices, reaching and sometimes excurrent from the acute apices in a smooth to hispidulous awn up to 0.5 mm long. *Utricles* rhomboid-lageniform, broadest along a rounded, girdling ridge at about 2 mm from the base, with a secondary rounded nitrate ridge just below the beak, 5.5-6 mm long, 1.25-1.6 mm broad, distinctly multinerved, scarcely marginate, covered sparsely, or subdensely above, with minute pale bristles, base glabrous, straight, suberect to patulous, subgradually tapering below to the subrotund base, which is abruptly 0.25-0.4 mm long stipitate, tapering above and swelling into the secondary ridge, whence subabruptly beaked ; *beak* subconic, subterete or subcompressed, 0.75-1 mm long, very narrowly marginate, minutely hispidulous, bidentulate ; *teeth* straight or slightly converging. *Achene* ovoid-ellipsoid, and slightly rhomboid from an interrupted, rounded transverse ridge below the middle, faces deeply concave below, flat to slightly convex above, becoming dark-spadiceous with whitish patches, angles pale, about 4 mm long, 1.3-1.6 mm broad, tapering below, base abruptly contracted into a cylindric-trigonous, 0.75-1 mm long pale stipe, tapering above, apex subabruptly contracted into a cylindric, 0.75-1 mm long, 0.65-0.75 (base)-0.7-0.8 mm (apex) in diameter, pale or reddish brown, neck or beak, its apex pale, truncate, faintly undulate, hollowed out (not annulate). *Style*-base not or scarcely thickened, centred in the hollow apex of the beak of the achene.

Annam : Ba-Do, near Tourane, rare, 1400-1500 m., 7 March 1939, *Poilane* 29,285 (K, P)!

Philippine Islands.

Source : MNHN, Paris

### 49. *Carex breviscapa* C. B. Clarke.

*Carex breviscapa* C. B. Clarke in Hook. f., Fl. Brit. Ind. 6 : 736 (1894) ; Kükenth., 474 ; Nelmes, 369. — Ceylon, *Thwaites* 3781.

Tufted. *Stems* suberect, central, usually more or less hidden in the crowded leaves and their sheaths, the rhachis only being visible, but sometimes some of the stem proper is free, 4-16 cm tall, about 1 mm thick, smooth. *Leaves* rather numerous, basal, much longer than the stems, 3-6.25 mm wide, flat-plicate, apex attenuated, lowest reduced to leafless sheaths or their fibrous remains ; *sheaths* brown. *Spikes* usually 5-7, single at each node, rarely up to about 20 through branching, partly hidden amongst the leaves. approximate and fastigiate except the lower 1-2 which are farther apart and subfastigiate, cylindric, erect or suberect, terminal 1-2.25 cm long, about 1 mm thick, lateral spikes female, or androgynaeceous with the male part usually very much shorter than the female, 1-3 cm long, female part 3-4 mm thick, lax-flowered, upper subsessile of shortly peduncled, lower on rather shortly, lowest sometimes on longly, exserted peduncles ; *peduncles* very slender, angles scaberulous. *Bracts* foliaceous, lower much exceeding the stem, upper much reduced, shorter than their own spikes to extending to the apex of the stem. *Female glumes* oblong or oblong-ovate, flattish to cymbiform with involute margins below, apex acute to rounded, 2-3 mm long, 1-1.75 mm wide, slenderly nervose, pale brownish-white, margins widely whitish-byaline above, centrally green-white striped, midrib scarcely extending to the apex or 1 mm hispidulously excurrent. *Utricles* rhomboid-lageniform, broadest along a rounded girdling ridge at about the middle, with a secondary rounded mitrate ridge just below the beak, distinctly angled, 3.5-5 mm long, 1.25-1.5 mm broad, multinerved, scarcely marginate, glabrous below, glabrescent or sparsely puberulous above, straight, suberect to patulous, tapering below to a somewhat rounded base and then abruptly stipitate, tapering above from the primary to the secondary ridge and then abruptly beaked ; *beak* subconic, plano-convex or compressed, 0.5-1 mm long, hispid-puberulous, bidentulate ; *teeth* straight. *Achene* more or less rhomboid, faces concave above and below a central horizontal ridge, especially below, 2.25-3 mm long, 1.25-1.5 mm broad, tapering below to a subbulbously stipitate base, tapering more gradually above from the central ridge to a broad, truncate apex, which has a discoid-annulate margin, becoming dark brown with pale stipe, apex, and angles. *Style*-base sometimes slightly thickened.

Annam : Dalat, ravine of the river Prenh, 6 Dec. 1924, *Evrard* 2069 (K. P)!

Ceylon, Formosa, Malaysia, Queensland.

Source : MNHN, Paris

### Sect. 16. Mitratae Kükenth.

in Engl. Pflanzenr. IV, 20 : 458 (1909).

*Stems* usually rather slender, short, and central. *Bracts* sheathing. *Spikes* few, terminal male, lateral female or, less often, androgynaeceous. *Female glumes* usually oblong-obovate or oblong-ovate. *Utricles* usnally more or less ellipsoid. *Achene* mitrate, i.e. contracted and more or less discoid-annulate at the apex ; *beak* straight. *Stigmas* 3.

Spikes 1-3 cm long, female 2-3 mm thick ; lower bracts longly or very longly sheathing ; female glumes ovate or oblong-ovate ; utricles 3-3.5 mm long ..... 50. *C. cambodiensis.*

Spikes 4-15 mm long, female 3-4 mm thick ; lower bracts shortly or very shortly sheathing ; female glumes obovate or oblong-obovate ; utricles 2-2.75 mm long ..... 51. *C. royleana.*

### 50. *Carex cambodiensis* Nelmes.

*Carex cambodiensis* Nelmes in *Kew Bull.* 1946 : 11, 26 (1946). — Cambodia, *Poilane* 23,139.

Densely tufted. *Rhizome* short. *Stems* erect or suberect, sometimes slightly curved and flexuous, obtusely to obscurely angled, 17-45 cm tall, 0.5-1 mm thick, smooth, including the rhachis, surrounded, below the leaves, by the fibrous remains of old leaf-sheaths. *Leaves* basal and subbasal, shorter to much shorter than the longer of the stems, 2-4 mm wide, flat, apex longly attenuated. *Spikes* 3-7, erect or suberect, situated on the upper third to half of the stem, lowest often with 1-2 smaller spikes at its base, others single at each node, slenderly cylindric, upper 3-4 approximate and fastigiate, lower more distantly spaced, lowest sometimes arising on a very long and slender peduncle from a basal leaf-sheath, terminal 2-3 cm long, 1-1.5(2) mm thick, remainder usually androgynaeceous hut sometimes wholly female, 1-3 cm long, male part much shorter than the female, female part 2-3 mm thick, on scarcely or shortly exserted peduncles ; *peduncles* very slender, mainly smooth. *Bracts* of the lower spikes foliaceous, usually much shorter than but sometimes slightly exceeding the stem, upper bracts much reduced, subherhaceous or glumiform ; *sheaths* brown, especially at the base, subampliate. *Female glumes* ovate or oblong-ovate, deeply cymbiform, apex usually subobtuse, sometimes subacnte or even acute, 1.75-2 mm long, 1.25-1.5 mm wide, brown with wide, whitish and thin margins, midrib and two adjacent nerves coalescing above and usually excurrent in a relatively stoutish minutely ciliolate-hispidulous awn up to 0.5 mm long. *Utricles* ellipsoid, 3-3.5 mm long, about 1 mm broad, slenderly multinerved, narrowly marginate, glabrous, or sometimes glabrescent or minutely and sparsely scurfy or setulose above, including the margins, straight, becoming patulous, very shortly stipitate, gradually tapering above, except for a slightly inflated apex, into a *beak* which tapers, 0.2-0.4 mm long,

Source : MNHN, Paris

marginate, glabrous or minutely and sparsely scaberulous-margined, bidentulate. *Achene* oblong-ovoid or oblong-ellipsoid, faces concave, about 2.5 mm long, about 1 mm broad, brown, shortly stipitate, contracted at the apex into a slightly tapering, very short, stramineous, annulate neck or beak, 0.5 mm wide and 0.25 mm long, which is truncate-intruse at the apex. *Style*-base slightly thickened.

Cambodia : Bokor, Elephant Mtn., in very poor acid sandy soil, by a path, 1000 m., 4 Dec. 1933, *Poilane* 23,078 (K) ! ; ibid., Elephant Mtn., on the new road between Bokor and the Cascade, poor sandy soil, 900 m., 5 Dec. 1933, *Poilane* 23,139 (K, P) !

### 51. *Carex royleana* Nees ex Wight.

*Carex royleana* Nees ex Wight, Contrib. Bot. Ind. 127 (1834) ; Boott, Illustr. 1 : 6, t. 19 (1858) ; E. G. Camus in Lecomte, Ft. Gén. Indo-Chine, 7 : 195 (1922). — India, *Royle* 36 and 152.

*Carex boniana* Boeck. in *Allg. Bot. Zeitschr.* 2 : 190 (1896). — Tongking, *Bon.*

*Carex breviculmis* B. Br. subsp. *royleana* (Nees ex Wight) Kükenth. in Engl. Pflanzenr. IV, 20 : 469 (1909).

Tufted. *Rhizome* extremely short. *Stems* erect, somewhat curved, or even flexuous, obtusely angled, 8-38 cm tall, 0.25-0.5 mm thick, wholly smooth or angles scaberulous above and on the rhachis. *Leaves* basal, mostly shorter to very much shorter than the stems, 0.9-3 mm wide, flat to plicate-revolute, erect to somewhat curved, apices longly attenuated, lower reduced to nearly bladeless sheaths, surrounded by the persistent fibrous remains of older leaf-sheaths. *Spikes* 3-5, erect to patulous, closely contiguous to approximate, 4-15 mm long, terminal slenderly fusiform or subcylindric, lateral spikes female, shortly cylindric, 3-4 mm thick, sessile or subsessile to very shortly peduncled. *Bracts* of the lower 1-2 female spikes subfoliaceous, much exceeding the inflorescence, upper bracts much reduced, inconspicuous ; *sheaths* pale and membranous at the mouth. *Female glumes* obovate or oblong-obovate, cymbiform, apex sometimes subacute but often very obtuse to truncate-rotund, 2-2.5 mm long, 1.4-1.8 mm wide, milky white, midrib green, coalescing with 2 adjacent nerves and excurrent in a tapering, ciliolate-bispidulous-margined awn, 0.3-2 mm long. *Utricles* ellipsoid or obovoid-ellipsoid, obtusely to obscurely angled, 2-2.75 mm long, 1.1-1.2 mm broad, slenderly multinerved, very narrowly marginate, rather sparsely bispidulous-hirtellous, straight, becoming patulous, shortly stipitate, subgradually to subabruptly beaked ; *beak* compressed-conic, 0.5-0.9 mm long, scarcely or very narrowly marginate, glabrous to sparsely bispidulous, emarginate or scarcely bidentulate. *Achene ellipsoid* or obovoid, angles obtuse with the faces flattish or convex above and deeply concave below, sometimes 1-2 of the 3 angles sunk into a cavity at the centre, 1.5-1.6 mm long, about 1 mm broad, becoming dark brown to cinereous-fuscous, scarcely or

Source : MNHN, Paris

very shortly stipitate, abruptly and very shortly beaked ; *beak* discoid-annulate and 0.2-0.4 mm in diameter at the apex. *Style*-base scarcely or slightly thickened.

Tongking : West Tongking ; in the neighbourhood of Hanoi, *Bon.*

India, China, Japan.

I have not seen the Bon specimen but Camus's description, so far as it goes, agrees with the type and other Indian specimens of *C. royleana* Nees ex Wight, so that I have ventured to include this species in my revison.

Sect. 17. **Radicales** (Kükenth.) Nelmes
in *Reinwardtia*, 1 : 389 (1951).

Subsect. *Radicales* Kükenth. in Engl. Pflanzenr. IV, 20 : 480 (1909).

*Spikes* 1-3 (4), often distantly spaced, lowest sometimes arising from a basal leaf-sheath, androgynaeceous. *Bracts* usually sheathing, sometimes 2-3 empty ones crowded below the terminal spike. *Female glumes* spongy-thickened and gibbous at the often strongly incurved base, pale, margins erose-ciliolate above. *Utricles* strongly multinerved, margins ciliolate-hispidulous from the base upwards ; *beak* short, shortly bilobed. *Stigmas* 3.

Female part of spike 8-11 mm thick ; female glumes 4-5 mm long ; utricles 6-7 mm long ..... 52. *C. pterocaulos.*

Female part of spike 2-7 mm thick ; female glumes 2.25-3 mm long ; utricles 3.5-6 mm long :

Leaves 3-11 mm wide ; utricles 4.25-6 mm long .....
..... 53. *C. speciosa* var. *speciosa.*

Leaves 1.5-2 mm wide ; utricles 3.5-4 mm long.....
..... 53 *C. speciosa* var. *angustifolia.*

52. **Carex pterocaulos** Nelmes.

*Carex pterocaulos* Nelmes in Hook., Ic. Pl. 35 : t. 3467 (1947). — Burma, *Russell* (Bot. Surv. Ind. Field No. 1845).

*Rhizome* and base of *stem* unknown. Portion of *stem* present erect or suberect, angles with wide wings, 25-35 *cm* long, 3.5-4 mm broad (including the wings, the stem proper being about half this breadth), rather soft, angles smooth or sparsely scabrid below, subdensely scabrid towards the apex. Lower *leaves* unknown, 3-5 situated on the lower part of the portion of stem present, much or very much longer than the stem, 9-11.5 mm wide, flat or flattish, septate-nodulose above, upper surface rough with small protuberances and setae, apex attenuated. *Spikes* 1-2, usually 1, the second (lateral) represented by an empty bract, at nodes 2-6 cm apart, 2.5-4 *cm* long, erect or suberect, lateral usually sessile, sometimes very shortly pe-

Source : MNHN, Paris

duncled, female part ellipsoid-cylindric to ovoid, 8-11 mm thick, usually longer than the male part, which is cylindric but tapering above, 3-3.5 mm thick. *Bract* of the lateral spike, or empty bract, foliaceous, much exceeding the stem, with 2 basal membranous auricles in front, sometimes united into a sheath, its base sometimes transversely crimped, also 2-3, usually 3, empty bracts, the lower 1-2 subfoliaceous, the uppermost subfoliaceous or setaceous, all crowded below and exceeding, and the uppermost apparently subtending, the terminal spike. *Female glumes* oblong with a triangular upper third. or oblong-ovate and acuminate, cymbiform or sub-conduplicate, especially below, sometimes flattish above, apex acute or subacute, 4-5 mm long, 2.5-3 mm wide, glabrous, conspicuously nervose, midrib and 2 adjacent nerves coalescing above and forming a stoutish tip at the apex. *Utricles* ellipsoid or rhomboid-ellipsoid, compressed-trigonous or trigonous, the ventral face wider than each half of the angled dorsal face, 6-7 mm long, 2.5-2.75 mm broad, marginate, dorsally glabrous or sparsely scurfy-hispidulous towards the apex, ventrally whitish-hispidulous above, glabrous or glabrescent below, slightly incurved, becoming suberect to patulous, subgradually or subabruptly tapering below into an oblong or slightly tapering basal part about 1.5-2 mm long, with a rounded-truncate, scarcely stipilate base, gradually tapering above ; *beak* compressed-cylindric, gradually tapering, marginate, hispidulous-margined below, glabrous or glabrescent above. *Achene* ellipsoid but tapering below, or orbicular-obovoid-ellipsoid, angles very prominent, palish, faces concave, dark brown, 4.5-4.75 mm long (including stipe and beak), 2.3-2.5 mm broad, base subabruptly cylindric or trigonous-cylindric, palish, 1 mm long stipitate, apex abruptly beaked ; *beak* trigonous-cylindric, inflexed, 0.75 mm long, palish, apex slightly thickened or discoid-annulate. *Style*-base trigonous, hispidulous, thickened.

Lower Burma : Tavoy ; head waters of Sedi Chaung, 13 Sept. 1920, *P. T. Russell* (Bot. Surv. Ind. Field No. 1845) (CAL, K)!

This is a striking plant and a very distinct member of its section because of its widely winged stems, its empty bracts, and the very stout female part of its spikes.

### 53. *Carex speciosa* Kunth var. *speciosa*.

*Carex speciosa* Kunth, Enum. Pl. 2 : 504 (1837) ; Kükenth., 481 ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 197 (1922) ; Nelmes, 390, var. *speciosa*. — India, *Wallich* 3391.

*Carex conrtallensis* Nees apud Boott, Illustr. 1 : 52, t. 138 (1858). — India, *Wight* 991.

Tufted. *Rhizome* short. *Stems* erect, oblique or somewbat curved, angles subacute to very narrowly winged, 4-55 cm tall, slender (0.5-1.5 mm thick) smooth or finely scaberulous throughoul, clolhed at the base, below the leaves by withered semifibrous leaf-sheaths.

Source : MNHN, Paris

*Leaves* subhasal, mostly longer or much longer than the stems, 3-11 mm wide, flat or flattish-plicate, margins sometimes revolute, often septale-nodulose, apices longly attenuated. *Spikes* 1-3 (4), at nodes 5-10 cm or more apart, lowest sometimes arising from a basal leaf-sheath, more or less cylindric, 1-4 cm long, female part 4-7 mm thick, usually much longer than but sometimes about as long as the male part, which is slender, tapering to an acute apex, on usually shortly exserted peduncles ; *peduncles* acutely angled, usually smooth. *Bracts* of the lateral spike or spikes foliaceous, usually exceeding the stem, sheathing ; *sheaths* membranous in front ; *bract* of the terminal spike glumiform, amplexicaul or shortly sheathing, aristate or subherbaceous. *Female glumes* oblong-ovate, deeply cymbiform, apex often obtuse, sometimes subacute or even acute, 2.5-3 mm long, about 2 mm wide, glabrous, brownish nervose, midrib prominent, scarcely or about extending to a firm tip at the apex. *Utricles* ellipsoid or ellipsoid-lanceolate, ventral face much wider than each half of the angled dorsal face, 4.25-6 mm long, 2.25-2.5 mm broad, narrowly marginate, smooth or slightly scurfy, dorsally glabrous, ventrally glabrous or whitish-hispidulous above, straightish or slightly curved, suberect or patulous, base spongy-turgid, scarcely stipitate, gradually beaked above ; *beak* subtrigonous or plano-convex, glabrescent or ventrally minutely hispidulous. *Achene* obovoid, oblong-obovoid, or ellipsoid, angles prominent, pale, faces flattish to concave, becoming dark brown, 3-3.5 mm long, 2 mm broad, base abruptly or subabruptly, shortly stipitate, apex rounded, abruptly and very shortly beaked. *Style*-base pyramidally thickened.

Thailand-Burma border : Tripagodas, about 40 km. north of Wangka on sandy soil, 280 m., 9 May 1946, *Wichian* (Kwae Noi River Basin Exped. 1946, No. 400) (K) !

Thailand : N. Thailand ; Chiengmai, Doi Sutep, open ground, 330 m., 28 July 1911, *Kerr* 1929 (BM, K) ! Cent. Thailand ; Saraburi, Menam Sak, in mixed deciduous forest, ± 30 m., 6 June 1923, *Kerr* 7062 (BM, K) ! ; Pen. Thailand ; Prachuap, Kao Ngoen, Payawn, evergreen forest, ± 200 m., 8 July 1926, *Kerr* 10,905 (K) ! ; Langsuan, Takaw, 13 June 1928, *Put* 1629 (K) !

Tongking : W. Tongking ; Hao Nho, on mountains near Ninh Binh, 1883-85, *Bon* 724 (P) ! ; on the mountains of Nhan Phan, *Bon* 1316.

Laos : Exped. Mc-Kong, 1866-68, Paklač, *Thorel* 2949 (P) !

Cambodia : Compong Chalnang, July 1921, *Petelot* 239 (P) !

Cochin China : [without precise locality] *Pierre* (P) !

India, Sumatra, Java.

*C. courtallensis* Boott, based on *Wight* 991 from south India, is in my opinion conspecific with *C. speciosa*. Its leaves are no wider than those of the latter species. There is, however, an allied plant in India with wider leaves which Kükenthal, erroneously as I think, associated with Boott's epithet. There is a similarly wide-leaved plant

Source : MNHN, Paris

from Thailand (Chiengmai, Doi Sutep, evergreen jungle, 900 m., 6 June 1914, *Kerr* 3226), at Kew, too immature for one to be certain as to its identity or otherwise with the Indian plant, and E. G. Camus cites gatherings by *Pierre* and *Thorel* from Tongking, which may be the same thing. Until more and better material is available, both from India and Indo-China, the correct treatment of these wide-leaved plants must wait.

Var. ? **angustifolia** Boott, Illustr. 1 : 52 (1858). — India, *Wight* 3175 ; *J. D. Hooker*.

Tufted. *Rhizome* slender, short. *Stems* erect or somewhat curved, 7-20 cm tall, 0.3-0.5 mm thick, smooth, clothed, below the leaves, by fuscous semi-fibrous leaf-sheaths. *Leaves* basal and subbasal, mostly longer than the stems, 1.5-2 mm wide, margins strongly revolute, apices attenuated. *Spikes* 1-2, widely spaced when 2, more or less cylindric, 1-2 cm long, female part 2-3 mm thick, usually longer or much longer than but sometimes about as long as the slender, tapering male part, second spike on an exserted, slender, smooth *peduncle*. *Bract* of the lateral spikes foliaceous, exceeding or exceeded by the stem, sheathing. *Female glumes* ovate or oblong-triangular, deeply cymbiform, apex subacute to obtuse, 2.25-3 mm long, 1.5-2 mm wide, glabrous, slenderly brownish nervose, midrib not excurrent. *Utricles* (immature) obovoid but tapering below, 3.5-4 mm long, 1-1.25 mm broad, very narrowly marginate, sparsely hispidulous, mainly in longitudinal lines, straightish or slightly curved, suberect, scarcely or shortly and spongy stipitate, subabruptly beaked ; *beak* subcylindric, narrowly marginate, glabrescent or sparsely hispidulous-margined. *Achene* (only 1 examined) oblong-ellipsoid, 2 mm long, 1 mm broad, scarcely stipitate or beaked. *Style*-base thickened.

Tongking : Chapa, massif of the Sang la Van Chapa, humus among rocks, Aug. 1930, *Petelot* 6212 (P) ! ; calcareous rock fissures, ± 1800 m., summit of Sang là Van, Chapa, July 1943, *Petelot* 8543 (K) [1]

India.

This is a stilt smaller plant than the typical Indian form of this variety, but I am unwilling to give it a separate epithet now because of the great polymorphism of *C. speciosa* and its need of special study.

Sect. 18. **Rhomboidales** Kükenth. in
Engl. Pflanzenr. IV, 20 : 622 (1909).

*Stems* often lateral. *Leaves* often wide, flat. *Spikes* 2-6, terminal male, cylindric or clavate, lateral female or androgynaeceous, lax- to subdense-flowered. *Bracts* usually short, sheathing. *Female glumes* more or less oblong to lanceolate, fulvous or whitish, muticous to longly aristate. *Utricles* rhomboid, ellipsoid, or obovoid, sometimes subinflated, often large, multinerved, usually subabruptly beaked ; *beak* long or very long, bidentate. *Achene* ellipsoid to obovoid, faces

Source : MNHN, Paris

often flattish above, convex at the middle and concave below, often medianly sunk into a cavity on the angles, apex of beak often discoid-annulate. *Style*-base usually much thickened. *Stigmas* 3.

Leaves 3-8 mm wide ; spikes 1-1.5 cm long ; female glumes 5-5.5 mm long ..... 56. *C. ? hoozanensis.*

Leaves 5-22 mm wide ; spikes 2.5-8 cm long ; female glumes 2.75-5 mm long :

Utricles ellipsoid, 7-10.5 mm long, glabrous ; achene ellipsoid, 4-5.5 mm long, apex discoid-annutate ..... 54. *C. anomocarya.*

Utricles obovoid, 5-6 mm long, sparsely pubescent ; achene obovoid, 2-3 mm long, apex not discoid-annulate..... 55. *C. thibetica.*

### 54. *Carex anomocarya* Nelmes.

*Carex anomocarya* Nelmes in *Kew Bull.* 1950 : 202 (1950) ; Nelmes, 383. — Java, *Winckel* 1692 B.

*Carex manca* Boott var. *contigua* R. Gross in *Notizbl. Bot. Gart. Berl.* 14 : 193 (1938). — Tongking, *Petelot* 6127.

*Carex harlandii* Boott f. *longibracteata* Gross in *Notizbl. Bot. Gart. Berl.* 14 : 193 (1938). — Tongking, *Petelot* 1323.

Loosety tufted. *Rhizome* short. *Stems* central, erect, angles obtuse to acute, 30-70 cm tall, 1.5-2 mm thick below, smooth, including the rhachis. *Leaves* basal, most much exceeding the stems, 5-22 mm wide, apices attennated, not or only slightly septate-nodulose. *Spikes* 3-4, uppermost lateral spike rarely twinned, erect, terminal stenderly cylindric, 2.5-6 cm long, its « peduncle » abruptly much more slender than the rest of the stem, lateral spikes female, oblong-cylindric, 3.5-8 cm long, 6-10 mm thick, all except lowest approximate and fastigiate including the male spike, lowest often distant, on shortly or very shortly exserted peduncles ; *peduncles* smooth. *Bracts* of the lateral spikes foliaceous, decreasing rapidly in size from lowest to uppermost, from not nearly reaching to exceeding the apex of the terminal spike, shortly sheathing ; *sheaths* pale and membranous in front or at the mouth, subampliate ; male spike ebracteate or bract in form of long-awned glume. *Female glumes* oblong, sometimes gradually narrowing upwards, rarely oblong-lanceolate, cymbiform to flattish, apex subtruncate or subbilobed-emarginate, rarely more gradually merging into the awn, 3-5 mm long, 1.5-2.5 mm wide, dirty-white, marginal third on each side thin and nerveless, ciliolate round the apex, central part thickened by midrib and 2 equally strong adjacent nerves, which converge upwards and coalesce at or beyond the apex in a tapering, smooth or scaberulous-margined awn, 2-10 mm long. *Utricles* distorted-ellipsoid, the surface being uneven with concavities and convexities corresponding to the surface of the achene, subinflated, 7-10.5 mm long, 2-2.8 mm broad, glabrous, scarcely marginate, straight, becoming subpatulous or patulous, base spongy but scarcely stipitate, sub-



Source : MNHN, Paris

gradually or subabruptly beaked ; *beak* compressed, 2.5-4 mm long, basally inflated, scarcely tapering upwards, glabrous, dorsally narrowly and ventrally broadly pale-grooved, green-margined ; *teeth* lanceolate, 0.75-1.75 mm long, diverging, pale, nearly smooth ; *mouth* not oblique. *Achene* ellipsoid, distorted-trigonous, 4-5.5 mm long, 0.8-2 mm broad, faces flattish above, convex in the middle, concave below, angles deeply sunk into a cavity at the centre, abruptly, shortly, pale, and sometimes bent-stipitate, abruptly or subabruptly beaked ; *beak* cylindric, 0.5-1 mm long, sometimes flexuous, expanding into a discoid-annulate pale apex.

Tongking : Cho bo, 4 April 1909, *Alleizette* (P) ! massif of Tam Dao, ± 900 m., Jan. 1922, *Petelot* 423 ; ibid., ± 900 m., Feb. 1923, *Petelot* 1323, partim (P) ! ; ibid., forest path, ± 1200 m., April 1930, *Petelot* 6127 (B, ? destroyed) ; ibid., humid forest, ± 1100 m., Dec. 1930, *Petelot* 6131 (BOG) !

Annam : massif of Lang-Bian, Grand Piton Lang-Bian near the village of Beneur, 1500-2000 m., 15 Feb. 1916, *Chevalier* 30,868 (P) ! Prov. of Quang Tri ; massif of Dong Che, 700 m., soil clayey, forest, 22 May 1924, *Poilane* 11,282 (P) ! ; Prov. of Dong Tri, under ancient forest, rather poor clayey-schistous soil, 800-900 m., 11 March 1936, *Poilane* 25,336 (P) ! ; Nui Bach Ma station, near Huê, ancient forest, 1400 m., 12 April 1939, *Poilane* 29,620, 29,621 (P) ! [without locality], *Poilane* 32,833 (P) ! Prov. of Kontum ; Nui Dai Ding, near Dak Gley, granitic soil, 1200 m., 21 Jan. 1947, *Poilane* 32,844 (K, P) !

Hainan, Sumatra, Java.

I have not seen *Petelot* numbers 423 and 6127, and place them here with some diffidence.

### 55. *Carex thibetica* Franch.

*Carex thibetica* Franch., Pl. David. 2 : 141 (1888) et in *Nouv. Arch. Mus. Hist. Nat.*, Paris, 3. sér., 9 : 177 (1897) ! Kükenth., 626, fig. 106, A-E ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 199, fig. 29 (1-4) (1921). — China, Moupine, *David*.

Tufted. *Rhizome* short, stout. *Stem* suberect to curved-flexuous, arising singly from lower leaf-axils, angles obtuse, 25-55 cm tall, 0.5-1.25 mm thick, smooth, clothed with subherbaceous, sheathing, short-bladed acuminate leaves which are similar to the bracts and much smaller than the foliage leaves. *Leaves* arising from a short shoot, mostly slightly shorter to somewhat longer than the stems, erect to oblique, sometimes slightly curved, 10-18 mm wide, apices acuminate to attenuated, lower shorter-bladed and spadiceous at the base, not or scarcely sheathing. *Spikes* 3-5, single, upper subapproximate and subfastigiate, lower more distantly spaced, 3-6.5 cm long, terminal slenderly cylindric but tapering above, lateral androgynaeceous, suberect, male part a little longer to a little shorter than the female part, upper on scarcely to shortly lower on longly exserted peduncles ; *peduncles*

Source : MNHN, Paris

very slender. *Bracts* consisting mainly of a long sheath, the longly acuminate blade being subherbaceous and much shorter than the spike. *Female glumes* usually lanceolate or ovate-lanceolate, sometimes ovate, cymbiform-incurved to flattish above, apex acute or subacute, rarely subobtuse, 2.75-4 mm long, 1.25-2 mm wide, glabrous, dirty white to reddish-fulvous, especially above, margins not whitish-hyaline, midrib usually excurrent in a smooth awn up to 1 mm long. *Utricles* obovoid, inflated-trigonous, 5-6 mm long, 1.5-2 mm broad, very narrowly marginate, sparsely or very sparsely and shortly hispidulous-pubescent, straightish, becoming patulous, shortly stipitate, abruptly or subabruptly beaked ; *beak* compressed, scarcely or slightly tapering, 2-2.75 mm long, often slightly basally or subbasally inflated, glabrous or glabrescent, very narrowly to scarcely marginate ; *teeth* lanceolate, 0.4-0.5 mm long, diverging, pale, smooth. *Achene* obovoid or oblong-obovoid, distorted-trigonous, 2-3 mm long, 1.25-1.5 mm broad, faces flattish above or somewhat convex, especially at the middle, angles deeply sunk into a cavity at the centre, abruptly, shortly, pale and sometimes bent-stipitate, abruptly or subabruptly very shortly extremely bent, pale beaked, apex not discoid-annulate.

Laos : near Attopeu, *Harmand*.

China.

Harmand's specimen is unknown to me and I add it here on the authority of E. G. Camus in Lecomte, Fl. Gén. Indo-Chine. A description of the species is given above.

### 56. *Carex ? hoozanensis* Hayata.

*Carex ? hoozanensis* Hayata, Ic. Pl. Formosa, 10 : 67, fig. 44 (1921). Formosa, Hoozan, *Hayata*.

Densely tufted. *Stems* apparently lateral, erect to oblique, 8-30 cm tall, 0.5-0.6 mm thick throughout or broadening above to 8 mm, smooth below, rough just below the inflorescence. *Leaves* on short sterile shoots, about as long as the longer stems to much exceeding them, 3-8 mm wide, apices attenuated. *Spikes* (2-) 3, upper approximate and fastigiate and forming a terminal inflorescence 2-2.5 cm long, or lowest rarely more distant, terminal erect, cylindric, 1-1.5 cm long, apex acuminate, lateral spikes female, erect or suberect, 1-1.3 cm long 3-4 mm thick on shortly to scarcely exserted peduncles ; *peduncles* and *rhachis* smooth to hispidulous on the angles. *Bracts* of the female spikes subfoliaceous, erect to oblique, lower exceeding the apex of the male spike, shortly sheathing ; *sheaths* subampliate, densely hispidulous, mouth bilobed-truncate ; lowest glume of male spike long-awned. *Female glumes* lanceolate or oblong-lanceolate, flattish to cymbiform, acuminate, apex usually narrowly bilobed-truncate but sometimes subacute, 5-5.5 mm long, 2-2.5 mm wide, pale, tinged greenish above and brownish below, thin except for a thicker, greenish,



Source : MNHN, Paris

narrow central stripe, midrih and 2 adjaeenl nerves eoaleseing above and excurrent, from a point a little helow the apex of the glnme, in a hispidulous-margined awn, 1.3-2.5 mm long. *Utricles* rather immature, narrowly ellipsoid, eompressed trigonous, the only one nearly mature 9.5 mm long, 2 mm broad, not marginate, glabrous, straight to slightly eurved above, subpatulous, tapering to a shortly and stoutly brown-stipitate base, tapering ahove and slightly expanding into a bulbous apex, whieh is subabruptly heaked ; *beak* narrowly marginate, about 3 mm long, palish ; *teeth* linear, slender, 0.8-1 mm long, minutely hispidulous-margined ; *mouth* slightly dorsally oblique. *Achene* (only 1 examined — from the most mature utricle) ellipsoid, angles compressed, 5.25 mm long, 2 mm hroad, angles deeply sunk into a eavity at the eentre, shortly stipitate, abruptly and longly beaked ; *beak* trigonous with eoneave sides, about 0.4 mm thick, bent to the right at the base and bent baek to the left near the apex, slightly twisted, apex expanded 0.6 mm in diameter, discoid-annulate, pale.

Tongking : Massif of Tam Dao, ± 900 m., Dec. 1930, *Petelot* 6129 (BOG) !

Formosa.

The following plant may helong here hut it is too immature to be determined with eertainty.

Annam : Vinh prov., massif of Len Ca, near the Song Tong, calcareous rock, ± 390 m., 27 July 1929, *Poilane* 16,469 (P) !

### Sect. 19. **Tumidae** Kükenth.
in Engl. Pflanzenr. IV, 20 : 611 (1909).

*Terminal spike* male or gynaecandrous, lateral spikes female or androgynaeceous, ereet, rarely eernuous. *Bracts* sheathing or not. *Utricles* subinflated-trigonous, patulous to patent, sometimes nitidous, pluri- or multinerved. *Style*-base not or slightly thiekened. *Stigmas* 3.

Stems often hispidulous on the three sides towards the apex ;
  female glumes 1-1.8 mm long ; utrieles bispidulous.....
  ..... 58. *C. nemostachys.*

Stems glahrous on the sides ; female glumes 1.25-3 mm long ; utrieles glabrous :
  Braets sheathing the stem ; leaves 4-8 mm wide ; female glumes 1.75-3 mm long ..... 59. *C. œdorrhampha.*
  Bracts not or scareely sheathing the stem ; leaves 6-11 mm wide ; female glumes 1.25-1.5 mm long .... 57. *C. baviensis.*

### 57. *Carex baviensis* Franch.

*Carex baviensis* Franch. in *Nouv. Arch. Mus. Hist. Nat.*, Paris, 3 sér. 10 : 77, t. 8, fig. 2 (1898) ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 198, fig. 28 (9-12) (1922) ; Nelmes in *Kew Bull.* 1946 : 13, 27 (1946). — Tongking, *Balansa* 2825.

Source : MNHN, Paris

Tufted. *Stem* erect, angles very prominent, narrowly winged above, faces usually concave, smooth except the scaberulous angles of the rhachis, 58 cm tall, about 2.5 mm thick throughout. *Leaves* basal and subhasal, lowest reduced to a few leafless sheaths or cataphylls, and one leaf about half-way up the stem, shorter than to nearly equalling the stem, 6-11 mm wide, flat. *Spikes* 5, erect or subcrect, possibly subcernuous, upper approximate, lower subapproximate, denseflowered, cylindric, forming a terminal inflorescence about 10 cm long, terminal male, 6 cm long, about 1 mm thick, lateral spikes female, or androgynaeceous with male apices much shorter than the female bases, 3.5-7.5 cm long, 4-5 mm thick, scarcely to rather longly peduncled, lower scarcely laxer towards the base ; *peduncles* stoutish, lower narrowly winged, smooth or scaberulous on the wings. *Bracts* of the lower spikes foliaceous, much exceeding the stem, upper bracts very much reduced, shorter to much shorter than their spikes, not or scarcely sheathing. *Female glumes* oblong-obovate to spathulate, flattish above, apex bilobed-emarginate, 1.25-1.5 mm long, about 0.75 mm wide, thin, whitish or dirty-white, midrib, with two adjacent nerves forming a thicker central stripe, coalescing above, excurrent in a gradually tapering, often curved, hispidulously-margined awn 1-1.5 mm long. *Utricles* more or less ellipsoid, 3-3.25 mm long, 1-1.2 mm broad, distinctly multinerved, glabrous, narrowly marginate, straight, light brown, reddish-brown spotted, base spongy-thickened but not stipitate, subgradually narrowing at the apex into a *beak* which is subterete, very gradually tapering, about 1 mm long, glabrous, not inflated, rather pale ; *mouth* oblique, entire to bidentulate. *Achene* ellipsoid or obovoid-ellipsoid, angles obtuse, faces flattish, 1.25-1.5 mm long, 0.9 mm broad, not stipitate, erostrate.

Tongking : Mt. Bavi, margins of forests, 19 July 1886, *Balansa* 2825 (K, P) !

Kükenthal (Engler, Pflanzenreich, IV, 20 : 620 : 1909) placed this Balansa gathering under *C. japonica* Thunb. var. *chlorostachys* (Don) Kükenth.

### 58. *Carex nemostachys* Steud.

*Carex nemostachys* Steud. in *Flora*, 29 : 23 (1846) ; Kükenth., 615 ; Nelmes in *Kew Bull.* 1946 : 12, 27 (1946). — Japan, *Göring* 13.

*Carex excurva* Boott, Illustr. 1 : 57, t. 150 (1858). — India, *Hooker and Thomson.*

*Rhizome* longly creeping, clothed with large sheathing scales or their fibrous remains. *Stems* erect, angles prominent, often acute, faces flattish or shallowly concave, 30-83 cm tall, 1-3.5 mm thick below, smooth below, angles scabrid above, often scaberulous on the 3 faces at the apex and throughout the rhachis, especially near the nodes, surrounded at the base with a few pale brown to fuscous leafless sheaths and their fibrous remains. *Leaves* on the lower third to

Source : MNHN, Paris

half of the stem, mostly much exceeding the stem, 4-11 mm wide, apparently distichous, conduplicate below, flat or flattish above, longly sheathing ; *sheaths* brown, thinly membranous, readily fraying in front into strips or herring-bone-shaped fibres, mouth concave. *Spikes* 5-7 (9), erect or suberect, less often slightly cernuous, approximate to subapproximate and fastigiate or subcorymbose, except the lowest which is sometimes more distant, cylindric, dense-flowered, lower often laxer towards the base, forming a terminal inflorescence 7.5-25 cm long, terminal male, pale, rarely a shorter one just below it, 4-12.5 cm long, 1.5-4 *mm* thick, lateral female, fuscous, 3-14 cm long, 4-7 mm thick, all sessile or subsessile, or lower shortly pedunculed, less commonly lowest with a peduncle nearly 4 cm long ; *peduncles* smooth or sparsely covered with small pale bristly hairs, angles smooth or sparsely scabrid. *Bracts* of the lower spikes foliaceous or subfoliaceous, exceeding or exceeded by the terminal spike, upper bracts subherbaceous, shorter than their spikes or glumiform with long awns, none sheathing, except that of the lower at least basal pale auricles surround the stem and are concave in front, lowest less commonly shortly sheathing. *Cladoprophylls* well developed, probably due to the bracts not sheathing the stem in the upper female spikes, utriculiform below, bright-reddish and split open above. *Female glumes* lanceolate, oblong-lanceolate or oblong-ovate, cymbiform, apex subacute to very obtuse, 1-1.8 mm long, 0.3-1 mm wide, very thin, glabrous, whitish, midrib and two strong adjacent nerves, coalescing above, excurrent in a flattish, hispidulous-margined awn, 1-4.5 mm long. *Utricles* ellipsoid, ellipsoid-obovoid, or obovoid, 3-4 mm long, about 1 mm broad, slenderly pluri-nerved, scarcely marginate, hispidulous but sparsely so below, light olive brown, scarcely stipitate, apex abruptly or subabruptly beaked ; *beak* slightly tapering, subterete, 1-1.75 mm long, hispidulous, usually more or less reflexed, sometimes straightish ; *mouth* oblique, glabrous, pale with a reddish base, apex entire, becoming erose. *Achene* obovoid, ellipsoid-obovoid, or oblong-obovoid, faces shallowly concave, especially below, 1.25-2 mm long, 0.8-1 mm broad, scarcely stipitate, a very short but bent and twisted beak at the apex. *Style*-base bent and sometimes slightly twisted. *Stigmas* long and slender, reddish.

THAILAND : E. Thailand ; Korat, Bukanum, on sandbank in stream, c. 400 m., 5 Jan. 1925, *Kerr* 9847 (BM, K) !

Assam, Bengal, Upper Burma, China, Japan.

### 59. *Carex œdorrhampha* Nelmes.

*Carex œdorrhampha* Nelmes in *Kew Bull.* 1939 : 659 (1939) ; Nelmes, 396. — New name for *C. tumida* Boott.

*Carex tumida* Boott, Illustr. 1 : 66, t. 181 (1858) ; C. B. Clarke, 16 ; Kükenth., 615 ; non *C. tumida* Beilschm. (1850). — India, *Hooker f.*

Tufted. *Stems* erect, angles prominent, faces often concave, 50-114 cm tall, 1.75-3 mm thick below, scarcely more slender upwards,

Source : MNHN, Paris

smooth, including most of the rhachis, which is sometimes scaberulous above. *Leaves* basal, with 1-2 higher up, subdistichous, lower basal ones short-bladed, few of the lowest reduced to reddish-purple sheaths, most leaves about as long as the stem, 4-8 mm wide, conduplicate below, flattish to plicate above, apices longly attenuated ; *sheaths* often dark reddish-brown or reddish-purple, membranous in front and readily fraying into thin strips. *Spikes* 4-8, erect or suberect, or subcernuous, upper approximate and fastigiate, lower or lowest distant, rarely one with a small spike at its base. cylindric, subdense-flowered, lower sometimes laxer towards the base, 2-12 cm long, forming a terminal inflorescence 9-90 cm long, terminal male, 1-3 mm thick, lateral spikes female, 4-7 mm thick, uncommonly androgynaeceous with male apices 5-7 mm long, upper on scarcely or shortly, lower on longly or very longly exserted peduncles ; *peduncles* rather slender, usually hispidulous, especially on the angles. *Bracts* of the lateral spikes usually foliaceous and much exceeding the stem, but uppermost sometimes much reduced, upper shortly lower longly to very longly sheathing ; *bract* of the male spike short, setaceous to subfoliaceous, half or more as long as the spike ; *sheaths* ferrugineous and often scabrid at the mouth, otherwise glabrous or sparsely scurfy-scabrid. *Female glumes* oblong-lanceolate to ovate lanceolate, cymbiform, apex often truncate-obtuse, 1.75-3 mm long, 1-1.5 mm wide, glabrous or sparsely hispidulous in places, especially near the midrib, whitish or pale, sometimes with castaneous spots and patches, margins irregularly whitish, midrib, with 2 adjacent coalescing nerves, excurrent in a sparsely hispidulous or serrulate-margined awn, 0.75-2 mm long. *Utricles* obovoid-ellipsoid or ellipsoid, 3-3.75 mm long, 1-1.25 mm broad, raised pluri-nerved, glabrous, narrowly marginate, straight, lurid, becoming fuscous-brown, not or scarcely stipitate, subgradually or subabruptly beaked ; *beak* subterete, 1-1.3 mm long, glabrous, narrowly marginate, palish, gradually tapering but slightly to conspicuously inflated at or below the middle ; *mouth* minutely notched, becoming erose and often subentire. *Achene* ellipsoid or slightly oblong-ellipsoid, angles prominent, faces flattish, or concave below, 2-2.25 mm long, 0.9-1.2 mm broad, minutely puncticulate, scarcely stipitate, beaked ; *beak* cylindric, about 2 mm long, straight or bent. *Stigmas* small and caducous.

THAILAND : N. Thailand ; Chiengmai, Doi Intanon, ± open swampy ground, 2 May 1921, *Kerr* 5317 (BM, K) !

ANNAM : Thai Ngayaen prov. ? Don Du, *Eberhardt* 3950 (K) !
Dran, 14 June 1921, *Hayata* 898 (K, P) !
India, China, Malaysia.

### SECT. 20. **Hirtae** Tuckerm.,
### Enum. Meth. 14 (1843).

*Rhizome* longly creeping. *Stems* leafy only in the lower third. *Leaves* septate-nodulose ; *sheaths* splitting in front into herring-bone

Source : MNHN, Paris

shaped fibres. *Spikes* 4-8 (12), upper 2-5 (7) male, others female. *Bracts* foliaceous, only lowest or lower sheathing. *Female glumes* mucronate or aristate. *Utricles* often turgid or subinflated-trigonous, strongly nerved, usually hairy-hispidulous, beak bidentate or oblique at the apex. *Achenes* often with prominent angles and flat or concave faces, beak often bent. *Stigmas* 3.

Awns of female glumes 1.5-5 mm long ; utricles 4-6 mm long, beak 1.75-2 mm long ; achenes ellipsoid or rhomboid-ellipsoid ..... ..... 62. *C. sacerdotis.*

Awns of female glumes 0-2 mm long ; utricles 3.5-5 mm long, beak 0.75-1.3 mm long ; achenes ovoid, ohlanceolate, ellipsoid or oblong-ellipsoid :

Leaves 5-7 mm wide ; female glumes oblong-elliptic, 3.25-4 mm long ; utricles obovoid or ellipsoid, gradually beaked, mouth extremely dorsally oblique ..... 60. *C. chaetogyne.*

Leaves 2-5 mm wide ; female glumes ovate, ovate-lanceolate or oblong-lanceolate, 2.5-3.5 mm long ; utricles usually ovoid or oblong-ovoid, usually abruptly beaked, mouth not or scarcely oblique ..... 61. *C. fedia.*

### 60. *Carex chaetogyne* Nelmes.

*Carex chaetogyne* Nelmes in Kew Bull. 1946 : 9, 27 (1946). — Thailand, *Kerr* 5094.

Not tufted. *Rhizome* curved-ascending, clothed with the fibrous remains of sheathing scales. *Stem* erect, angles subacute, 56 cm tall, about 1.5 mm thick above the basal sheathed part, smooth, including the rhachis, surrounded at the base by the withered remains of sheaths. *Leaves* basal and subhasal, mostly exceeding the stems, 5-7 mm wide, flat or flattish, with margins sometimes revolute above ; *sheaths* pale brown, thinly membranous in front. *Spikes* 8, erect to subpatulous, upper 6 contiguous to approximate, or subapproximate, lower 2 at nodes about 8 cm apart, binate at a middle node, others single, cylindric, 1-3 cm long, 3-4.5 cm thick, dense-flowered except lower 2 which are sublax towards the base, all sessile except the lowest which is on a smooth exserted peduncle, upper 5 male or lowest of these androgynaeceous, lower 3 female. *Female glumes* oblong-elliptic, cymbiform, apex obtuse, usually very obtuse or bilobed-emarginate, 3.25-4 mm long, 1.25-2 mm wide, glabrous, whitish with a submarginal brownish zone, margins becoming erose, midrib and 2 strong adjacent nerves, coalescing above, excurrent in a flattish, smooth or finely ciliolate-margined awn, 1-1.5 mm long. *Utricles* obovoid or ellipsoid, obscurely trigonous, 4-4.5 mm long, 1.4-1.6 mm broad, scarcely marginate, densely pale subadpressed-hispidulous, straightish to much curved or bent, dark brown below, paler above, not stipitate, gradually beaked above ; *beak* slightly tapering, flattish or subterete, 1-1.3 mm long, glabrous or glabrescent, pale, bidentate ; *mouth* extremely dorsally

Source : MNHN, Paris

oblique ; *teeth* lobe-like, short, straight or slightly divergent. *Achene* ovoid or oblanceolate, angles conspicuous, faces concave, about 2 mm long and 1 mm broad, scarcely stipitate ; *beak* trigonous-cylindric, 0.3-0.4 mm long, forming with the achene a slight curve. *Style*-base slightly thickened, glabrous below, densely and minutely whitish-setulose towards the stigmas. *Stigmas* stoutish, densely covered with small whitish protuberances.

Thailand : N. Thailand ; Chiengrai, Muang Pan ; in dry mud by river, c. 400 m., 17 March 1931, *Kerr* 5094 (BM, K) !

Endemic.

### 61. *Carex fedia* Nees.

*Carex fedia* Nees in Wight, Contrib. Bot. Ind. 129 (1834) ; Krecz. in Komarov, Fl. SSSR, 3 : 417 (1935) ; Nelmes in *Kew Bull.* 1946 : 9, 27 (1946). — India, *Royle* 114.

*C. wallichiana* Presc. in Wall., List Pl. E. Ind. Comp. Mus. 118 (1828), nomen ; ex Nees in Wight, Contrib. Bot. Ind. 129 (1834) ; C. B. Clarke, 16 ; Kükenth., 749 ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 201, fig. 29 (9-11) (1922) ; *non* Spreng. — India, *Wallich* 3380.

Loosely tufted. *Rhizome* clothed at first with sheathing scales which soon fray into fibres. *Stems* erect, acutely angled, 20-80 cm tall, 1-3 mm thick below, smooth except on the rhachis where the angles are sometimes sparsely scaberulous, surrounded at the base by fuscous or spadiceous cataphlls. *Leaves* basal and subbasal, shorter to longer than the stems, 2-5 mm wide, flat or flallish ; *sheaths* palish, thinly membranous in front. *Spikes* 4-8 (12), single, erect or suberect, 1-5 cm long, dense-flowered, upper 2-5 (7) male, slenderly cylindric, 1.5-4.5 mm thick, contiguous to approximate and usually fastigiate or subfastigiate, lateral male spikes sessile, remaining 2-3 (4) female, cylindric, 5-8 mm thick, upper or sometimes all subapproximate and sessile or subsessile, lower usually more distantly spaced and shortly peduncled, sometimes lowest peduncle exserted from a short sheath ; *peduncles* slender, smooth. *Female glumes* ovate, ovate-lanceolate, or oblong-lanceolate, cymbiform, lower margins sometimes involute, apex acute to obluse or subtruncate, 2.5-3.5 mm long, 1.5-2 mm wide, glabrous, dirty white to bright brownish, margins sometimes whitish-hyaline above, midrib and 2 adjacent nerves, coalescing above, in a wide pale stripe, usually excurrent in a sparsely hispidulous margined awn up to 2 mm long. *Utricles* usually ovoid or oblong-ovoid, sometimes ellipsoid, 3.5-5 mm long, 2-2.2 mm broad, not or very narrowly marginate, densely palish bispidulous-pubescent, straigbt or straightish, pale to brownish, scarcely to very shortly stipitate, usually abruptly but sometimes subabruptly beaked ; *beak* scarcely tapering, plano-convex to subcylindric, 0.75-1.25 mm long, glabrous or hispidulous, scarcely or narrowly marginate, palish, bidentate ; *mouth* not or scarcely dorsally oblique ; *teeth* 0.25-0.75 mm long, straight

Source : MNHN, Paris

to very divergent. *Achene* ellipsoid or oblong-ellipsoid, apex slightly rounded, faces flattish or slightly concave below, 2.75-3 mm long (including stipe and beak), 1.25-1.75 mm broad, shortly but distinctly stipitate ; *beak* cylindric-trigonous, 0.4-0.6 mm long, slightly to extremely bent. *Style*-base not or scarcely thickened.

Lower Burma : Pegu, *Kurz* 2696.

Afghanistan, India, China.

### 62. *Carex sacerdotis* Nelmes.

Carex sacerdotis *Nelmes, sp. nov. ; affinis* C. fediae *Nees, sed glumarum feminearum aristis longioribus, utriculis longioribus, achaeniis interdum rhomboideo-ellipsoideis praecipue differt.* — Tongking, *Bon* 1976.

Tufted. *Rhizome* clothed with sheathing scales. *Stems* erect, angles prominent, 30-50 cm tall, 1-1.5 mm thick, smooth, including the rhachis, surrounded at the base by reddish-brown or paler cataphylls. *Leaves* basal and subbasal, shorter to longer than the stems, 2.5-5.5 mm wide, flat or flattish ; *sheaths* pale brown, thinly membranous in front. *Spikes* 6-7, single, erect or suberect, dense-flowered, upper 3-4 male, slenderly cylindric, 1.5-3 mm thick, terminal 2.5-3.5 cm, lateral 1-2 cm, long, contiguous to approximate, and fastigiate or subfastigiate, lateral male *spikes* sessile, remaining 2-4 female, cylindric, 1-5 cm long, 5-9 mm thick, upper usually subapproximate and subsessile or shortly peduncled, lower, less commonly all, more distantly spaced and shortly to longly or very longly peduncled ; *peduncles* slender, smooth. *Female glumes* tapering-oblong or lanceolate-oblong, flattish with involute margins, apex very obtuse to subtruncate, 2.25-3 mm long, 0.8-1 mm wide, glabrous, bright brownish, midrib and 2 strong adjacent nerves, coalescing above, in a broad pale stripe, excurrent in a flattish, ciliolate-hispidulous-margined awn 1.5-5 mm long. *Utricles* ovoid, ovoid-lanceolate, or ellipsoid, 4-6 mm long, 1.75-2 mm broad, narrowly marginate, densely pale subadpressed-hispidulous, straight or straightish, dark brown, shortly stipitate, subabruptly beaked ; *beak* not or scarcely tapering, plano-convex, 1.75-2 mm long, glabrous or glabrescent, marginate, hispidulous-margined, palish, bidentate ; *mouth* scarcely to moderately dorsally oblique ; *teeth* 0.5-1 mm long, slightly to extremely divergent. *Achene* ellipsoid or rhomboid-ellipsoid, much tapering at each end but especially at the base, angles prominent, faces concave below, about 3 mm long (including beak), about 1.4 mm broad, scarcely stipitate ; *beak* cylindric-trigonous, 0.5-1 mm long, somewhat bent. *Style*-base not or scarcely thickened.

Tongking : West Tongking ; in streams among mountains between Lan Mat and Lat Son, 15 March 1883, *Bon* 1976 (K, P) ! ; ibid. [without precise locality], *Bon* 2856 (P) ! ; ibid. [without precise locality], *Bon* 4128. This last Bon number is cited by Kükenthal in his monograph under *C. wallichiana* Presc., but it probably belongs

Source : MNHN, Paris

here. I have not seen it. E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 201, fig. 29 (9-11) (1922) describes (presumably) and cites the above-mentioned gatherings, as « Tonkin : vers Ninh-hinh (Bon) », under *C. wallichiana* Presc.

Endemic.

Differs from *C. fedia* Necs in its longer, more tapering utricles with much longer beaks and its achene which is ellipsoid or rhomboid-ellipsoid with tapering apex (not oblong-ellipsoid with rounded apex), and glumes with much longer awns, darker coloured utricles, with different pubescence.

In this species I twice found 2 achenes in one utricle. The second one was each time smaller and misshapen.

### Sect. 21. **Scleriiculmes** Nelmes
in *Kew Bull.* 1951 : 121 (1951).

*Rhizome* shortly creeping. *Stems* yellowish, nearly wholly hidden by leaf-sheaths. *Leaves* of normal kind only on the upper half of the stem, merging above into the leafy bracts, decreasing below into purplish or vinaceous bladeless sheaths, which clothe the lower half of the stem, not septate-nodulose, liguliferous ; *sheaths* glabrous or hispidulous. *Spikes* 4-9, terminal male, lateral female or androgynaeceous, subdense- or dense-flowered. *Bracts* foliaceous, lower, at least, very much exceeding the stem, longly sheathing. *Female glumes* small, pale but covered with small glandular reddish flecks and streaks. *Utricles* small, ellipsoid or ellipsoid-obovoid, nerveless, densely whitish-setulose, green with glandular reddish spots, subabruptly or abruptly beaked. *Achene* obovoid or ellipsoid-ohovoid. *Style*-base thickened. *Stigmas* 3.

Only Indo-Chinese species ..... 63. *C. maubertiana.*

### 63. **Carex maubertiana** Boott.

*Carex maubertiana* Boott, Illustr. 1 : 45, t. 114 (1858) ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 200, fig. 29 (1-8) (1922) ; Nelmes, 408. — Cochinchina, *Gaudichaud* 69.

*Carex hebecarpa* C. A. Mey. var. *maubertiana* (Boott) Franch. in *Nouv. Arch. Mus. Paris*, 3 sér. 10 : 70 (1898) ; Kükenth., 745.

Loosely tufted. *Stems* erect or suberect, or base sometimes slightly curved, visible only for short lengths and only below and on the rhachis, otherwise hidden by leaf-sheaths, 38-60 *cm* tall, 2-3 mm thick below, smooth but angles sparsely scaberulous on the rhachis above. *Leaves* exceeded by to far exceeding the stem, 3-7 mm wide, flattish to strongly revolute, apices attenuated ; *sheaths* long, rather tight, uppermost ones sparsely subadpressed-hispidulous in places ; *ligule* obtuse, membranaceous, ferrugineous. *Spikes* erect or suberect, cylindric, 1.5-4 cm long, upper 2-6 approximate or subapproximate, fastigiate, on included or very shortly exserted peduncles, remainder

Source : MNHN, Paris

a little farther apart, on scarcely to rather longly exserted peduncles, terminal with rarely a much smaller one at its base, rarely a few female flowers at the apex or interspersed, 1-2 mm thick, lateral spikes female, or androgynaeceous with very few apical male flowers, 4-6 mm thick ; *peduncles* slender, hristly. *Bracts* foliaceous but upper reduced, mostly far exceeding the terminal spike ; *sheaths* hispidulous, especially near the mouth ; *bract* of male spike a long-awned glume. *Female glumes* ovate, oblong-ovate, or triangular-ovate, flattish or cymbiform to incurved, apex obtuse to rounded, 1.3-2 mm long, 1.25-1.5 mm wide, glabrous, margins rather widely whitish-hyaline and erose-ciliolate above, nerveless or very slenderly nervose, midrib and 2 closely parallel nerves, forming a pale stripe, coalescing above, from failing to reach the apex to excurrent in a mucro up to 0.3 mm long. *Utricles* with obtuse angles, and flattish faces, 3-3.8 mm long, 1.25-1.75 mm broad, becoming patulous, curved or bent below, otherwise straightish, subabruptly narrowing below into a conic, marginate, glabrescent stipe-like base ; *beak* gradually tapering, planoconvex, 1-1.2 mm long, marginate, setose and densely whitish setose-margined, bidentate ; *mouth* not or slightly ventrally oblique ; *teeth* straight. *Achene* distinctly angled, faces flat or shallowly concave, 2-2.4 mm long, 1-1.5 mm broad, stipe-like base bent, not or extremely shortly beaked.

Annam : Tourane ; Jan. 1837, *Gaudichaud* 69 (P) ! Dalat, 3 June 1921, *Hayata* 188 (P) !

India, China, Malaysia.

The following specimen, which is too poorly developed to be classified with certainty, seems to belong to Sect. *Ferrugineae* Tuckerm., a section not otherwise known to be represented in Indo-China.

Annam : summit of Nui Bach Ma station, a little south of Hué, poor clayey-schistous soil in primitive forest, 1400-1500 m., 11 Sept. 1938, *Poilane* 27,571 (P) !

Sect. 22. **Praelongae** (Kükenth.) Nelmes
in *Reinwardtia*, 1 : 421 (1951).

Subsect. *Praelongae* Kükenth. in Engl. Pflanzenr. IV, 20 : 345 (1909).

*Rhizome* creeping or tufted. *Leaves* with sheaths splitting in front, often into herring-bone shaped fibres. *Terminal spike* male or gynaecandrous, remainder often more or less female, often fastigiate, more or less peduncled, often cernuous. *Bracts* not or lowest shortly sheathing. *Female glumes* mucronate or aristate. *Utricles* and *achenes* compressed-biconvex. *Style*-base not or slightly thickened. *Stigmas* 2.

Terminal spike male, lateral ones androgynaeceous or, less commonly, wholly female ; utrieles 2.25-3 (3.5) mm long. 66. *C. phacota.*
Upper 1-3 (4) spikes gynaeceandrous, rarely male at each end, lateral ones usually female ; utricles 3-4.5 mm long :

Source : MNHN, Paris

Upper 2-3 (4) spikes gynaecandrous, remaining ones female or some slightly gynaecandrous ; female glumes oblong, oblong-ovate, or elliptic, 3-3.75 mm long ; utricles 3.5-4.5 mm long, dorsally 5-7 nerved ..... 64. *C. kerrii.*

Terminal spike gynaecandrous, rarely male at each end, lateral ones female or some slightly androgynaeceous ; female glumes spathulate-oblong, 1.5-2.5 mm long ; utricles 3-3.75 mm long, nerveless ..... 65. *C. dimorpholepis.*

### 64. *Carex kerrii* Nelmes.

*Carex kerrii* Nelmes in *Kew Bull.* 1939 : 304-05 (1939) et 1946 : 7, 28 (1946). — Laos, *Kerr* 21,031.

Tufted. *Rhizome* short. *Stems* distinctly angled, 50-65 cm tall, about 2 mm thick below, smoth below, angles sparsely scaberulous just below and on the rhachis. *Leaves* basal and subbasal, lower reduced to purplish-red, short-bladed leaves and leafless sheaths, equalling or exceeding the stem, 4-5.5 mm wide, flattish, apices longly attenuated ; *sheaths* purplish-red. *Spikes* 5-7 (9), cernuous, subapproximate and fastigiate, but lowest at a node 2.5-4.5 cm distant from the next above, upper 2-3 (4) gynaecandrous, base less than half to about two-thirds male, remaining spikes female or some slightly gynaecandrous, female spikes cylindric, gynaecandrous spikes more or less clavate, 3-7.5 cm long, female part 4-6 mm and male 1-2 mm thick, subdense-flowered, base often laxer, mostly single, middle spikes sometimes with a smaller spike from the same node ; *peduncles* rather slender, smooth. *Bracts* of the lower spikes foliaceous, much exceeding the terminal spike, upper bracts subfoliaceous to setaceous, slightly exceeding to exceeded by the terminal spike. *Female glumes* oblong, oblong-ovate or elliptic, shallowly cymbiform, apex usually obtuse, sometimes rounded, less often subacute to acute, 3-3.75 mm long, 1-1.5 mm wide, pale with light reddish spots below and on the lower margins, otherwise blackish-red with indefinite vinaceous margins, midrib pale, excurrent in a mucro or awn, usually 0.25-0.5 mm but sometimes up to 1 mm or more long, smooth or sparsely scaberulous-margined. *Utricles* mostly elliptic, 3.5-4.5 mm long, 1.2-1.8 mm broad, dorsally obscurely to rather strongly 5-7-nerved, ventrally nearly nerveless to obscurely 2-5-nerved, marginate, margins usually undulate and dorsally less commonly ventrally revolute above, glabrous, straightish, becoming subpatulous to patulous, brownish-stramineous, minutely densely light reddish-glandular, base rounded-cuneate and ventrally convex, not or scarcely stipitate, gradually narrowed above into a *beak*, which is subterete, about 1.5 mm long, glabrous, blackish-red ; *mouth* emarginate. *Achene* ovate, broadly elliptic, or suborbicular, about 2.25 mm long, about 1.5 mm broad, narrowed slightly below into a stout stipe-like base, subabruptly beaked at the apex ; *beak* terete, slender, about 0.25 mm long.

Source : MNHN, Paris

Laos : Pu Bia ; in open patch in evergreen forest, about 2500 m., 13 April 1932, *Kerr* 21,031 (BM, K) !

### 65. *Carex dimorpholepis* Steud.

*Carex dimorpholepis* Steud., Syn. Pl. Glum. II, Cyper. 214 (1855), *saltem pro parte* ; Nelmes in Kew Bull. 1946 : 7, 28 (1946). — No specimen cited.

*Carex cernua* Boott, Illustr. 4 : 171, t. 578 (1867) ; C. B. Clarke, 6 ; Kükenth., 353 ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 193 (1922), non *C. cernua* J. F. Gmel. (1791) nec *C. cernua* Phil. (1857-58). — India, *Griffith* 1489.

Tufted. *Rhizome* very short. *Stems* erect, angles obtuse, 25-66 cm tall, 1.5-2 mm thick, smooth below, angles sparsely bispidulous towards the inflorescence, surrounded at the base, below the leaves, by golden - brown to blackish - red leafless - sheaths or cataphylls. *Leaves* basal and subbasal, mostly exceeding the inflorescence, 3.5-7 mm wide, flat, apices longly attenuated, lower ones short-bladed ; *sheaths* brown or pale in front, often with minute reddish-brown dots. *Spikes* 3-8, single, middle ones rarely binate, rarely lowest with a smaller spike branching from its base, subapproximate and fastigiate, lowest one distant, cernuous, dense-flowered, terminal gynaecandrous, male and female parts often about equal but variable in length, rarely basal and upper third male and middle female, 3.25-7 cm long, male part 2-4 mm thick, gradually thickening upwards, remainder female, or sometimes with a few male flowers at the apices, rarely also at the bases, cylindric, 2-6 cm long, 4-7 mm thick ; *peduncles* acutely angled, angles hispid, except on the lowest which is usually smooth. *Bracts* of the lower spikes foliaceous, exceeding to much exceeding the stem, upper bracts reduced and exceeded by their spikes, terminal spike ebracteate. *Female glumes* spathulate-oblong, flattish, apex usually bilobed-emarginate, less often rounded-truncate, 1.5-2.5 mm long, 0.6-1 mm wide, glabrous, whitish with small reddish, shining and apparently glandular, flecks and streaks, with a wide, 3-nerved, central stripe, which narrows above and is excurrent in a tapering, sparsely hispidulous-margined awn, 0.3-4 mm long. *Utricles* elliptic, base rounded or truncate-rounded, 3-3.75 mm long, 1.5-2 mm broad, densely and minutely punctate-papillose, dark-reddish and apparently glandular spotted, nerveless, narrowly marginate, margins sometimes slightly revolute, glabrous, straight or apex sometimes slightly recurved, patulous to patent, yellowish to cinnamomeous, sometimes dull reddish-brown towards the apex, especially on the margins, base abruptly, shortly, subconically stipitate, tapering above and abruptly beaked ; *beak* cylindric, up to 0.3 mm long, pale or reddish-tipped, apex entire ; *mouth* very small. *Achene* elliptic to suborbicular, about 2 mm long, 1-1.25 mm broad, densely punctate-papillose, base very stoutly and very shortly stipitate, apex abruptly beaked ; *beak* up to 0.4 mm long.

Source : MNHN, Paris

Tongking : environs of Ninh-binh, *Bon* ; Hanh Lam, in marshy places at the foot of Mt. Tho, May 1885, *Bon* 2891 (P) ! ; banks of the Loch-Nam, between Chu and Lam, 9 March 1886, *Balansa* 221 (K, P)!; banks of the Black River, up stream from Phuong Lam, on the rocks re-covered by the floods of summer, 2 May 1888, *Balansa* 2826 (K, P)!; Kien Khe, towards the foot of the Chua Dong Mtn., 13 April 1889, *Bon* 4127 (P) !

India, Burma, China, Korea, Japan.

### 66. *Carex phacota* Spreng.

*Carex phacota* Spreng., Syst. 3 : 826 (1826) ; Drejer, Symb. Caric. 15, t. IV (1844) (excl. syn. *C. notha* et *C. punctata*) ; Boott, Illustr. 1 : 63, t. 168 (1858) ; C. B. Clarke, 6 ; Kükenth., 350. Based on *C. lenticularis*.

*Carex lenticularis* D. Don in *Trans. Linn. Soc.* 14 : 331 (1824), non Michx. (1803). — India, *Wallich*.

Loosely tufted. *Rhizome* shortly creeping. *Stems* erect, acutely angled, 22-120 cm tall, 1-3 mm thick below, smooth up to, or sparsely scaberulous just below, the inflorescence, scaberulous on the rhachis, at least above, surrounded below the leaves, by a few almost leafless, dark brown or ferrugineous, sheaths, which are entire or split in front into very fine reticulate fibres. *Leaves* subbasal, and occasionally 1-2 situated higher up the stem, much shorter to much longer than the stems, 3-8 mm wide, apices attenuated ; *sheaths* ferrugineous or reddish-spotted. *Spikes* 4-6, rarely more, subapproximate and fastigiate, or the lowest more distant and subfastigiate, cylindric, 2-8 (10) cm long, dense-flowered, not noticeably laxer at the base, terminal male with sometimes a few female flowers above, erect, 1.25-4.5 mm thick, remainder androgynaeceous, less commonly wholly female, suberect to cernuous, 4-6 mm thick ; *peduncles* slender, smooth to sparsely scaberulous. *Bracts* of the lower spikes foliaceous, usually much exceeding the terminal spike, upper bracts much smaller, equalling to much shorter than their spikes, with two conspicuous ferrugineous or dark brown membranous auricles in front at the base ; bract of the male spike a long-awned glume. *Female glumes* oblong or obovate-oblong, flattish to shallowly cymbiform, often becoming deeply canaliculate by the concaving of a central stripe and flattening of wide margins, apex usually very obtuse to bilobed-emarginate, rarely subacute, 1.25-3 mm long, 0.75-1.5 mm wide, castaneous or ferrugineous with pale margins, or pale with reddish flecks, and with a pale 3-nerved central stripe, narrowing and coalescing above and excurrent in a tapering, sometimes smooth but usually sparsely scaberulous-margined awn, 0.5-2 mm long. *Utricles* broadly elliptic, obovate, or suborbicular, rarely elliptic-lanceolate, often with a slight longitudinal ridge down the centre of the dorsal face, 2.25-3 (3.5) mm long, 1.5-2.2 mm broad, nerveless, or obscurely 1-few-nerved on the dorsal face, very narrowly marginate, glabrous, usually densely and ferrugi-

Source : MNHN, Paris

neously, sometimes light reddish, glandular-papillose except on the margins above and towards the apex where the surface is cinereous-papillose, becoming patulous to subpatent, very shortly and conically stipitate, subabruptly beaked ; *beak* conic or cylindric, extremely short, stramineous or cinereous, entire, apex rounded ; *mouth* minute. *Achene* pyriform-orbicular, pyriform-obovoid, or suborbicular, 1.75-2 mm long, 1.25-1.8 mm broad, tapering to a short stipe-like base, apex rounded-truncate, abruptly contracted into a short, terete, straight to bent beak.

Lower Burma : Tenasserim, according to Kükenthal.

India, Japan, Malaysia.

### Subgen. 3. **VIGNEA** Nees.

Key to the Sections.

| | |
|---|---|
| Spikes androgynaeceous, numerous ..... | 23. *Multiflorae* |
| Spikes gynaecandrous, not numerous ..... | 24. *Elongatae*. |

### Sect. 23. **Multiflorae** Kunth,

Enum. Pl. 2 : 387 (1837).

*Spikes* androgynaeceous, usually numerous or very numerous, simple, or lower compound, lower often in the axils of foliaceous bracts. *Utricles* plano-convex, nervose, margins acute or winged, glabrous or minutely serrate-hispidulous above.

Only Indo-Chinese species ..... 67. *C. thomsonii*.

### 67. *Carex thomsonii* Boott.

*Carex thomsonii* Boott, Illustr. 1 : 1, t. 1 (1858) ; C. B. Clarke, 5 ; Kükenth., 143 ; E. G. Camus in Lecomte, Fl. Gén. Indo-Chine, 7 : 183, fig. 26 (1-4) (1912) ; Nelmes in *Kew Bull.* 1946 : 14, 28 (1946). — India, *Thomson*.

Tufted. *Rhizome* very short, stout, densely covered at first with sheathing brown, black-nerved scales, which later become persistent black fibres. *Stems* erect, obtusely angled, 10-33 cm tall, 1.5-2.5 mm thick below, surrounded at the base, below the leaves, by pale to fuscous subentire to fibrous remains of old leaf-sheaths and leafless sheaths. *Leaves* spaced throughout the stem nearly up to the inflorescence, most much longer than the stem, 2-4.5 mm wide, mostly conduplicate, some flattish, especially above, smooth except the scaberulous margins towards the very longly attenuated apices ; *sheaths* hiding the stem, membranous and pale in front where densely covered with minute reddish, glandular spots. *Spikes* with male part few-flowered and inconspicuous, subglobose, ovoid, ellipsoid, or shortly cylindric, 3-8 mm long, 3-4 mm thick, subdense- or dense-flowered, subpatulous or patulous, sessile, usually simple and contiguous, but

Source : MNHN, Paris

basal ones often slightly separated, and rarely slightly compound, forming a terminal inflorescence, cylindric or somewhat tapering upwards, 3-8.5 cm long and 0.6-1 cm thick. *Bracts* of the lower 1-2 spikes subfoliaceous, much exceeding to shorter than the inflorescence, upper bracts glumiform, lower of these longly awned, none sheathing except infrequently the lowest. *Female glumes* ovate to ovate-lanceolate, deeply cymbiform, apex subacute to subobtuse, 2-2.5 mm long, 1.25-1.5 mm wide, white, covered with minute red spots or specks, margins becoming erose, midrib and 2 adjacent nerves forming a light castaneous stripe, coalescing just below or at the apex, and occasionally hispidulously mucronate. *Utricles* elliptic or ovate to ovate-lanceolate, 2.25-2.75 mm long, 1-1.3 mm broad, slenderly multinerved, marginate, especially above, margins somewhat bent towards the ventral face, glabrous, straight, becoming patulous to subpatent, golden or golden-brown below, stramineous above, covered with minute reddish spots or flecks, especially at base and apex, minutely serrulate on the upper margins, base more or less rounded, gradually tapering above into a beak-like portion, the apical 0.25 mm less tapering and less serrulate, bidentulate. *Achene* elliptic or ovate and slightly quadrate, plano-convex or biconvex, dorsally and usually ventrally medianly slenderly ridged, 1.3-1.75 mm long, 0.8-1 mm broad, nitidous, pale coffee coloured or livid, scarcely stipitate, very shortly and slenderly beaked. *Style*-base not thickened.

Tongking : rocky margins of the Black River, downstream from Tu-Phop, submerged during the floods of summer, April 1888, *Balansa* 2820 (K, P) ! ; Ba He Backein, *Eberhardt* 4766 (K, P) !

India, China.

Sect. 24. **Elongatae** Kunth,
Enum. Pl. 2 : 402 (1837).

*Spikes* gynaecandrous, more or less bracteate. *Utricles* convex-concave, margins winged.

Only Indo-Chinese species ..... 68. *C. craspedotricha*.

### 68. *Carex craspedotricha* Nelmes.

*Carex craspedotricha* Nelmes in *Kew Bull.* 1939 : 657 (1939), et 1946 : 7, 28 (1946). — China, *Tutcher* (Hongkong Herb. No. 10,643).

*Carex imbricata* Kükenth. in Handel-Mazzetti, Symb. Sinic. 7 : 1260, fig. 38 (2) (1936). Not. *C. imbricata* Drobov in Key Pl. Envir. Tashkent, ed. Popov. 51 (1923). — China, *Handel-Mazzetti* 11,688.

Tufted. *Rhizome* short. *Stems* obtusely angled, 20-65 cm tall, 1-2 mm thick, flaccid, suberect to oblique, surrounded at the base by brown fibrous remains of old leaf-sheaths. *Leaves* basal and subbasal, a few lower short-bladed or reduced to sheaths, remainder mostly much shorter than the stems, 2-4 mm wide, flat, flaccid, apices lon-

Source : MNHN, Paris

gly attenuated. *Spikes* 12-16, male few-flowered and inconspicuous, mostly ovoid or ellipsoid, sometimes shortly cylindric or subglobose, 5-10 mm long, 4-6 mm thick, dense-flowered, suberect, sessile, simple, upper contiguous or approximate, lower approximate, lowest 1(2) often 2-2.5 cm distant, forming a terminal inflorescence 8-13 cm long. *Bracts* of the lower spikes foliaceous, much longer than the inflorescence, middle bracts subfoliaceous, upper reduced to long, awned glumes, none sheathing. *Female glumes* ovate to ovate-lanceolate, shallowly cymbiform, apex acute to subobtuse, 2-2.75 mm long, about 1 mm wide, whitish, glabrous, midrib slender, stramineous, usually shortly excurrent in a scaberulous mucro. *Utricles* ovate to elliptic (including broad wings), 3-3.3 mm long, 1.25-1.5 mm broad, 4-6 nerved on the central third of the convex dorsal face, 2-4(5)-nerved on the corresponding part of the concave ventral face, nerves converging above and below, wings wide and minutely scabrous-ciliolate-margined in the upper half, broad margins between the wings and the central nerved part nerveless and spongy, glabrous, straight, becoming subpatent, stramineous, tapering-rounded at the scarcely to very shortly stipitate base, gradually or subgradually beaked above ; *beak* tapering, biconvex, 0.5-0.75 mm long, winged-margined, wings wide at the base, narrowing upwards, the apex being scarcely winged, scabrous-ciliolate, bidentulate ; *teeth* lanceolate, straight. *Achene* oblong-ovate, biconvex, 2 mm long (including short stipe and beak), 0.75 mm broad, tapering to a stipitate base, apex rounded, abruptly beaked. *Style*-base not thickened.

Thailand : N. Thailand ; Chiengmai, Muang Fang ; Doi Pahom Pok, c. 1600 m., in open ground, 2 April 1921, *Kerr* 5184 (BM, K)! Muang Chem ; Doi Ngao, c. 1300 m., in moist ground by stream, 12 May 1921, *Kerr* 5429 (BM, K)!

China.

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Source : MNHN, Paris

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